

# Digital instruments and Measuring Transducers

Table: Digital instruments selection

|                           |                            | DM45                                                                              | DC B                                                                                | DHB                                                                                 |
|---------------------------|----------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                           |                            |  |  |  |
| Mounting                  | Pannel                     | –                                                                                 | 48 x 48<br>72 x 72                                                                  | 96 x 48                                                                             |
|                           | DIN rail                   | 2 modules                                                                         |                                                                                     |                                                                                     |
| AC measurement            | Single-phase               | •                                                                                 | •                                                                                   | •                                                                                   |
| AC measurement Parameters | Voltage                    | •                                                                                 | T                                                                                   | T (DHB-300)                                                                         |
|                           | Current                    | •                                                                                 | T                                                                                   | T (DHB-300)                                                                         |
|                           | Active power(W)            | –                                                                                 | –                                                                                   | T (DHB-300)                                                                         |
|                           | Frequenz (Hz)              | •                                                                                 | T                                                                                   | T (DHB-300)                                                                         |
|                           | Maximum demand (A)         | •                                                                                 | –                                                                                   | –                                                                                   |
| DC measurement Parameters | Voltage                    | –                                                                                 | T                                                                                   | T (DHB-200)                                                                         |
|                           | Current                    | –                                                                                 | T                                                                                   | T (DHB-200)                                                                         |
|                           | process signal             | –                                                                                 | T                                                                                   | T (DHB-400)                                                                         |
| Accuracy                  | 0,1                        | –                                                                                 | –                                                                                   | T                                                                                   |
|                           | 0,50%                      | –                                                                                 | •                                                                                   | •                                                                                   |
|                           | 1%                         | •                                                                                 | –                                                                                   |                                                                                     |
| No electric parameters    | Hour run meter             | –                                                                                 | –                                                                                   | T (DHB-100)                                                                         |
|                           | Temperature                | –                                                                                 | T                                                                                   | T (DHB-400)                                                                         |
|                           | Chronometer, impulse meter | –                                                                                 |                                                                                     | T (DHB-100)                                                                         |
|                           | Tachometer (r/min)         | –                                                                                 |                                                                                     | T (DHB-100)                                                                         |
| Other options             | auxiliar output relay      | •                                                                                 |                                                                                     | 2 ( 4 OP)                                                                           |
|                           | Analog output              | –                                                                                 |                                                                                     | T                                                                                   |
|                           | communications port        | –                                                                                 |                                                                                     | T                                                                                   |
|                           | Auxiliar power supply      | •                                                                                 | •                                                                                   | –                                                                                   |
|                           | Frontal adapter            | –                                                                                 | •                                                                                   | –                                                                                   |
| Page                      |                            | 58                                                                                | 59                                                                                  | 60                                                                                  |

T - Depending type / OP - Optional

## DM-45, Digital instruments, DIN rail

DM45 series, Rail DIN, 230 V, 40...70 Hz



| Type     | Code       |                             | Input                         | Relay |
|----------|------------|-----------------------------|-------------------------------|-------|
| DM45-V   | [*] M20901 | Voltmeter                   | 600 V ac                      | 1     |
| DM45-A   | [*] M20911 | Ammeter                     | ... / 5 A                     | 1     |
| DM45-AD  | [*] M20921 |                             | 30 A                          | 1     |
| DM45-F   | [*] M20931 | Frequencymeter              | 10 ... 600 Hz                 | 1     |
| DM45-CM  | [*] M20941 | Analizer<br>(V, A, Hz, THD) | 600 V / .../5 A / 10...600 Hz | 1     |
| DM45-CMD | [*] M20951 |                             | 600 V / 30 A / 10...600 Hz    | 1     |

Other parameters: Dimensions: 2 modules

| DM45              |                  |   |               |
|-------------------|------------------|---|---------------|
| Code              | Internal code    |   |               |
| M 2 X X X X 0 0 X |                  |   |               |
|                   |                  | ↑ | Delivery time |
| Auxiliary supply  | Standard (230 V) | 0 | -             |
|                   | 100 ... 115 V ac | 1 | 1             |
|                   | 18 ... 36 V dc   | 7 | 1             |

## DC B, Digital instruments, panel mounting

## DC B SERIE, 230 VCA, 40...70 HZ, 0,5% FE



DC 48B

| Voltmeters / Process indicators |            |        |                 |                                                            |            |  |
|---------------------------------|------------|--------|-----------------|------------------------------------------------------------|------------|--|
| Type                            | Code       | Mesure | Scale           | Input                                                      | Dimensions |  |
| DC 48B V ac (150,300,600 V)     | [*] M20210 | AC     | 150, 300, 600 V | Direct: 600 V<br>Transformer: Programmable                 | 48 x 48    |  |
| DC 72B V ac (150,300,600 V)     | [*] M20220 |        |                 |                                                            | 72 x 72    |  |
| DC 48B V dc (10,50,200 V)       | [*] M20213 | DC     | 10, 50, 200 V   | Direct: -200 / +200 V<br>Process: 0...10 V                 | 48 x 48    |  |
| DC 72B V dc (10,50,200 V)       | [*] M20223 |        |                 |                                                            | 72 x 72    |  |
| DC 48B V dc (600 V)             | [1] M20214 | DC     | 600 V           | -600 / 600 V                                               | 48 x 48    |  |
| DC 72B V dc(600 V)              | [*] M20224 |        |                 |                                                            | 72 x 72    |  |
| DC 48B mV dc (60,150,200 mV)    | [1] M20217 | DC     | 60, 150, 200 mV | Direct: -200 mV / +200 mV<br>Shunt: .../60 mV , .../150 mV | 48 x 48    |  |
| DC 72B mV dc (60,150,200 mV)    | [*] M20227 |        |                 |                                                            | 72 x 72    |  |



DC 72B

| Ammeters / Process indicators |            |        |               |                                                              |            |  |
|-------------------------------|------------|--------|---------------|--------------------------------------------------------------|------------|--|
| Type                          | Code       | Mesure | Scale         | Input                                                        | Dimensions |  |
| DC 48B A ac (/5 A)            | [*] M20211 | AC     | .../ 5 A      | Direct: 5 A<br>Transformer: .../ 5 A                         | 48 x 48    |  |
| DC 72B A ac (/5 A)            | [*] M20221 |        |               |                                                              | 72 x 72    |  |
| DC 72 MD                      | [*] M2022A | AC     | .../ 5 A      | Direct: 5 A<br>Transformer: .../ 5 A<br>1 Relay              | 72 x 72    |  |
| DC 48B A ac (10 A)            | [1] M20212 | AC     | 10 A          | Direct: 10 A                                                 | 48 x 48    |  |
| DC 72B A ac (10 A)            | [*] M20222 |        |               |                                                              | 72 x 72    |  |
| DC 48B A dc (5, 20, 200 mA)   | [1] M20215 | DC     | 5, 20, 200 mA | Direct: -200 mA / +200 mA<br>Process: 0...20 mA<br>4...20 mA | 48 x 48    |  |
| DC 72B A dc (5, 20, 200 mA)   | [*] M20225 |        |               |                                                              | 72 x 72    |  |
| DC 48B A dc (10 A)            | [1] M20216 | DC     | 10            | Direct: 10 A                                                 | 48 x 48    |  |
| DC 72B A dc (10 A)            | [*] M20226 |        |               |                                                              | 72 x 72    |  |

All the AC instruments measure in true effective value.

For other supply values, see codification table (110 Vdc auxiliary supply not possible)

## ADAPTERS

| Type                          | Code       |
|-------------------------------|------------|
| Frontal adapter               |            |
| Frontal adapter 72x72 > 96x96 | [*] M29914 |
| Frontal adapter 48x48 > 72x72 | [4] M29911 |
| Frontal adapter 48x48 > 96x96 | [4] M29912 |
| Frontal adapter 48x96 > 96x96 | [*] M29913 |

## CODIFICATION TABLE

## DC

| Code | Internal code |   |   |   |   |   |   |   |    |               |
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| M    | 2             | X | X | X | X | 0 | 0 | X | X  |               |
|      |               |   |   |   |   |   |   | ↑ | ↑  | Delivery time |
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110 V<sub>dc</sub> auxiliary supply not possible

Delivery time: [\*] immediate  
[x] working weeks  
[c] consult

## DHB, Digital multimeter

Power supply 85... 253 V<sub>ac</sub> / V<sub>dc</sub>


| Variables                                                                      | Type    | Code       | Outputs                      | Measurement                                                             |
|--------------------------------------------------------------------------------|---------|------------|------------------------------|-------------------------------------------------------------------------|
| Impulses, frequency, circular speed, periods, worktime, encoder position       | DHB-102 | [1] M22021 | 1 relays                     | imp, Hz,                                                                |
|                                                                                | DHB-124 | [1] M22022 | 3 relays + 1 analog + RS-485 |                                                                         |
| Voltmeter or ammeter<br>± 100...500 V <sub>dc</sub><br>± 1...5 A <sub>dc</sub> | DHB-202 | [1] M22023 | 2 relays                     | ± 100...500 V <sub>dc</sub><br>± 1...5 A <sub>dc</sub>                  |
|                                                                                | DHB-224 | [1] M22024 | 4 relays + 1 analog + RS-485 |                                                                         |
| Single-phase analyzer                                                          | DHB-302 | [1] M22025 | 2 relays                     | ± 100/400 V <sub>ac</sub><br>± 1/5 A <sub>ac</sub>                      |
|                                                                                | DHB-324 | [1] M22026 | 4 relays + 1 analog + RS-485 |                                                                         |
| Process / Resistance / Temperature                                             | DHB-402 | [1] M22027 | 2 relays                     | Pt100/500/1000<br>Thermocouple<br>J,K,N,E,R,S<br>± 20 mA, ± 10 V, 60 mV |
|                                                                                | DHB-424 | [1] M22028 | 4 relays + 1 analog + RS-485 |                                                                         |

## DH 96CPM, DC multimeter

DH 96 series, 230 V ac, 45...65 Hz ( panel mounting 96 x 48 mm)



Measurement center

| Type     | Code       | Mesure | Accuracy        | Range                                                      | Parameter      |
|----------|------------|--------|-----------------|------------------------------------------------------------|----------------|
| DH 96CPM | [2] M20419 | DC     | 0,2 % (± 1 dig) | Programmable<br>Selec. V : 100 / 300 / 800 V <sub>DC</sub> | V, A, kW, kW-h |

### CODIFICATION TABLE

| DH 96            |   |               |   |   |   |   |   |   |               |
|------------------|---|---------------|---|---|---|---|---|---|---------------|
| Code             |   | Internal Code |   |   |   |   |   |   |               |
| M                | 2 | X             | X | X | X | 0 | 0 | X | X             |
|                  |   |               |   |   |   |   |   |   |               |
| Auxiliary supply |   |               |   |   |   |   |   |   | Delivery time |
|                  |   |               |   |   |   |   |   |   |               |
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## Transducers

**Table: Measurement transducer selection**

|  |                                                                                                                                         |                                          |
|--|-----------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
|  | Voltage (V ac)                                                                                                                          | CVE / CV-A                               |
|  | Voltage (V ac)                                                                                                                          | CV-D                                     |
|  | Current (A ac)                                                                                                                          | CCE / CC-A / TP-420 / TC-020 / TCB / TCM |
|  | Current (A dc)                                                                                                                          | CC-D                                     |
|  | Active power (kW)                                                                                                                       | CW                                       |
|  | Reactive power (kvar)                                                                                                                   | CY                                       |
|  | Power factor                                                                                                                            | CPF                                      |
|  | cos $\varphi$                                                                                                                           | CCOS                                     |
|  | Resistance                                                                                                                              | CR2                                      |
|  | Temperature                                                                                                                             | CT-PT100                                 |
|  | Galvanic insulator                                                                                                                      | CUP                                      |
|  | Frequency (Hz)                                                                                                                          | CFE / CF                                 |
|  | Three-phase digital multi converter with 8 channels: Voltage, current, active power and reactive power, by phase and three-phase values | CVB-BD-420-8-H                           |

## CVE / CCE / CFE , Narrow section transducers

**Narrow section transducers, 230 V, 45...65 Hz**

| Type                  | Code              | Input range                                                                            | Network voltage              | Standard Output |
|-----------------------|-------------------|----------------------------------------------------------------------------------------|------------------------------|-----------------|
| AC Voltage transducer |                   |                                                                                        |                              |                 |
| <b>CVE-A</b>          | <b>[*] M25011</b> | Selecting: 110 / 300 / 400 / 500 / 690 V                                               |                              | 4...20mA        |
| <b>CVE-A-AP (1)</b>   | <b>[3] M25021</b> | Selecting: 115 / 240 / 400 V                                                           |                              | 0...20mA        |
| AC Current transducer |                   |                                                                                        |                              |                 |
| <b>CCE-A</b>          | <b>[*] M25111</b> | Selecting: 1 / 5 / 10 A                                                                |                              | 4...20mA        |
| <b>CCE-A-AP (1)</b>   | <b>[*] M25121</b> | Selecting: 1 / 5 / 10 A                                                                |                              | 0...20mA        |
| Frequency transducers |                   |                                                                                        |                              |                 |
| <b>CFE</b>            | <b>[3] M25511</b> | Selecting<br>0-100 / 45-55 / 55-65 / 45-65 / 47-53<br>/ 380-240 / 360-440 / 340-460 Hz | 50 ... 600 V                 | 4...20mA        |
| <b>CFE-AP (1)</b>     | <b>[3] M25521</b> |                                                                                        | Selecting: 115 / 240 / 400 V | 0...20mA        |

Specified AS PER THE CODE TABLE: 1. Code/ 2. Input range / 3. Output range / 4. Auxiliary power supply / 5. Specify grid voltage in CFE-AP

See the code table at the end of the section

(1) External auxiliary supply not required. 4...20 mA output Not possible

## CV / CC / CW / CY / CF / CPF / CUP / CR<sub>2</sub> , Transducers

### INPUTS

|            |                              |
|------------|------------------------------|
| Current AC | 1 or 5, .../ 1 A or .../ 5 A |
| Current DC | 500 $\mu$ A ... 10 A         |
| Voltage AC | 0 ... 690 V                  |
| Voltage DC | 10 mV ... 500 V              |

### OUTPUTS

|          |                                                               |
|----------|---------------------------------------------------------------|
| Output 1 | 0...5 V, 0...10 V, 0...10 mA, 0...20 mA (by default)          |
| Output 2 | 0,2...2 V, 2...10 V, 4...20 mA (by default)                   |
| Output 3 | -10...0...10 V, -5...0...5 V, -20 mA...0...20 mA (by default) |

### Electric parameters transducers

(1) Accuracy:  $\pm 0,5$  % reading, 40...90 Hz



< -- 40 mm -->

#### AC Voltage $\pm 0,2$ % reading

| Type        | Code       | Input range          | Output   | Output Standard |
|-------------|------------|----------------------|----------|-----------------|
| CV-A-AP(1)  | [1] M25041 | 0 ... 400 V          | Output 1 | 0...20mA        |
| CV-A        | [1] M25031 | 0 ... 690 V          | Output 1 | 0...20mA        |
| CV-A        | [1] M25032 |                      | Output 2 | 4...20mA        |
| CV-A-RMS    | [1] M25051 |                      | Output 1 | 0...20mA        |
| CV-A-RMS    | [1] M25052 |                      | Output 2 | 4...20mA        |
| CC-A        | [1] M25131 | .../ 1 A or .../ 5 A | Output 1 | 0...20mA        |
| CC-A        | [*] M25132 |                      | Output 2 | 4...20mA        |
| CC-A-AP (1) | [*] M25141 |                      | Output 1 | 0...20mA        |
| CC-A-RMS    | [1] M25151 |                      | Output 1 | 0...20mA        |
| CC-A-RMS    | [*] M25152 |                      | Output 2 | 4...20mA        |

External auxiliary supply not required.  
Specify: Zero value, full scale and output type. See table at the end of This section

Auxiliary supply 230 V, 40...90 Hz, Accuracy:  $\pm 0,5$  % reading



< -- 95 mm -->

#### Active power

| Type   | Code       | System                                   | Output      | Output Standard |
|--------|------------|------------------------------------------|-------------|-----------------|
| CW-M   | [1] M25211 | Single-phase                             | Output 1, 3 | 0...20mA        |
| CW-M   | [1] M25212 |                                          | Output 2    | 4...20mA        |
| CW-TE  | [1] M25221 | Balanced three-phase                     | Output 1, 3 | 0...20mA        |
| CW-TE  | [1] M25222 |                                          | Output 2    | 4...20mA        |
| CW-TA  | [1] M25231 | Unbalanced three-phase<br>ARON (3 wires) | Output 1, 3 | 0...20mA        |
| CW-TA  | [1] M25232 |                                          | Output 2    | 4...20mA        |
| CW-TAN | [1] M25241 | Unbalanced three-phase (4 wires)         | Output 1, 3 | 0...20mA        |
| CW-TAN | [1] M25242 |                                          | Output 2    | 4...20mA        |

Specify: zero value, full scale, output type,  $U_n$  (between phases),  $I_n$  and  $f_n$ , see table at the end of This section

### Electric parameters transducers

|                |          |            |                                          |             |          |
|----------------|----------|------------|------------------------------------------|-------------|----------|
| Reactive power | CY-M     | [1] M25251 | Single-phase                             | Output 1, 3 | 0...20mA |
|                | CY-M     | [1] M25252 |                                          | Output 2    | 4...20mA |
|                | CY-TE    | [1] M25261 | Balanced three-phase                     | Output 1, 3 | 0...20mA |
|                | CY-TE    | [1] M25262 |                                          | Output 2    | 4...20mA |
|                | CY-TA    | [1] M25271 | Unbalanced three-phase<br>ARON (3 wires) | Output 1, 3 | 0...20mA |
|                | CY-TA    | [1] M25272 |                                          | Output 2    | 4...20mA |
|                | CY-TAN   | [1] M25281 | Unbalanced three-phase (4 wires)         | Output 1, 3 | 0...20mA |
|                | CY-TAN   | [1] M25282 |                                          | Output 2    | 4...20mA |
| Power factor   | CPF-M    | [1] M25311 | Single-phase                             | Output 1, 3 | 0...20mA |
|                | CPF-M    | [1] M25312 |                                          | Output 2    | 4...20mA |
|                | CPF-TE   | [1] M25321 | Balanced three-phase (3 wires)           | Output 1, 3 | 0...20mA |
|                | CPF-TE   | [1] M25322 |                                          | Output 2    | 4...20mA |
|                | CPF-TEN  | [1] M25331 | Balanced three-phase (4 wires)           | Output 1, 3 | 0...20mA |
|                | CPF-TEN  | [1] M25332 |                                          | Output 2    | 4...20mA |
| Cos $\varphi$  | CCOS-M   | [1] M25341 | Single-phase                             | Output 1, 3 | 0...20mA |
|                | CCOS-M   | [1] M25342 |                                          | Output 2    | 4...20mA |
|                | CCOS-TE  | [1] M25351 | Balanced three-phase (3 wires)           | Output 1, 3 | 0...20mA |
|                | CCOS-TE  | [1] M25352 |                                          | Output 2    | 4...20mA |
|                | CCOS-TEN | [1] M25361 | Balanced three-phase (4 wires)           | Output 1, 3 | 0...20mA |
|                | CCOS-TEN | [1] M25362 |                                          | Output 2    | 4...20mA |

Specify: zero value, full scale, output type,  $U_n$  (between phases),  $I_n$  and  $f_n$ , see table at the end of This section

## Other electric parameters transducers



<- 40 mm ->

| Auxiliary supply 230 V, 40...90 Hz, Accuracy: ± 0,2 % reading                 |          |            |                         |              |                 |
|-------------------------------------------------------------------------------|----------|------------|-------------------------|--------------|-----------------|
|                                                                               | Type     | Code       | Input range             | Output       | Standard Output |
| Frequency                                                                     | CF       | [3] M25531 | 40 ... 690 V            | Output 1     | 0...20mA        |
|                                                                               | CF       | [1] M25532 | 0 ... 20 kHz            | Output 2     | 4...20mA        |
| Leakage current                                                               | CC-WG    | [3] M25631 | 0 ... 3 A ac            | Output 2     | 4...20mA        |
| See table at the end of M2                                                    |          |            |                         |              |                 |
| DC transducers. Auxiliary supply 230 V, 40...90 Hz, Accuracy: ± 0,5 % reading |          |            |                         |              |                 |
|                                                                               | Type     | Code       | Input range             | Output       | Output          |
| DC Voltage                                                                    | CV-D     | [1] M25061 | 10 mV ... 500 V         | Output 1, 3  | 0...20mA        |
|                                                                               | CV-D     | [1] M25062 |                         | Output 2     | 4...20mA        |
| DC Current                                                                    | CC-D     | [1] M25161 | 500 µA ... 10 A         | Output 1, 3  | 0...20mA        |
|                                                                               | CC-D     | [1] M25162 |                         | Output 2     | 4...20mA        |
| Galvanic insulator transducer                                                 |          |            |                         |              |                 |
|                                                                               | CC-G     | [*] M25610 | 600 µA mA 10 A... 20 mA |              | 9...20mA        |
| Other transducers                                                             |          |            |                         |              |                 |
|                                                                               | Type     | Code       | Input range             | Output       | Output          |
| Temperature                                                                   | CT-PT100 | [1] M25651 | According probe PT-100  | Output 1, 3  | 0...20mA        |
|                                                                               | CT-PT100 | [*] M25652 |                         | Output 2     | 4...20mA        |
| Resistance                                                                    | CR2      | [1] M25641 | 1 ... 20 kΩ             | Output 1, 3  | 0...20mA        |
|                                                                               | CR2      | [1] M25642 |                         | Output 2     | 4...20mA        |
| Process universal                                                             | CUP      | [1] M25612 |                         | Configurable | Configurable    |

Specify: zero value, full scale and output type. See table at the end of This section

## TC-420, Current transformer with converter

|                                                                                                                                               |                                                                                     |                  |                   |                                                                                       |                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------|-------------------|---------------------------------------------------------------------------------------|-------------------|
|                                                                                                                                               |  |                  |                   |  |                   |
| Type                                                                                                                                          | TC 420                                                                              |                  |                   | TC 020                                                                                |                   |
|                                                                                                                                               | TC 5 420                                                                            | TC 6 420         | TC 8 420          | TC 6 020A                                                                             | TC 8 020A         |
| internal Ø                                                                                                                                    | 20                                                                                  | 28               | 44                | 28                                                                                    | 44                |
| Flat strip mm                                                                                                                                 | 25 x 5                                                                              | 40 x 10          | 60 x 12           | 40 x 10                                                                               | 60 x 12           |
| <div><div><div>a</div><div>b</div><div>c</div></div></div> | 70<br>58<br>32                                                                      | 80,5<br>64<br>44 | 102<br>84,5<br>50 | 80,5<br>64<br>44                                                                      | 102<br>84,5<br>50 |
| A                                                                                                                                             | Output 4...20 mA, ext. supply 7,5...36 V <sub>dc</sub>                              |                  |                   | Output 0...20 mA                                                                      |                   |
| 5                                                                                                                                             | [*] M72112                                                                          |                  |                   |                                                                                       |                   |
| 10                                                                                                                                            | [*] M72113                                                                          |                  |                   |                                                                                       |                   |
| 20                                                                                                                                            | [*] M72114                                                                          |                  |                   |                                                                                       |                   |
| 50                                                                                                                                            | [*] M72131                                                                          |                  |                   | [*] M72031                                                                            |                   |
| 100                                                                                                                                           | [*] M72132                                                                          |                  |                   | [*] M72032                                                                            |                   |
| 200                                                                                                                                           | [*] M72134                                                                          |                  |                   | [*] M72034                                                                            |                   |
| 300                                                                                                                                           | [*] M72136                                                                          |                  |                   | [*] M72036                                                                            |                   |
| 500                                                                                                                                           | [*] M72151                                                                          |                  |                   | [3] M72051                                                                            |                   |
| 1 000                                                                                                                                         | [*] M72152                                                                          |                  |                   | [1] M72052                                                                            |                   |
| 1 500                                                                                                                                         | [*] M72153                                                                          |                  |                   | [*] M72053                                                                            |                   |

For higher currents use transformer + transducer

**TI-420 / TP-420 / TCM / TCB, Current transformer with converter 4...20 mA**

| Type                    | TI-420 35                                        | TI-420 70       | TI-420 105       | TP-420 23                | TP-420 58       | TCM-420 25                                                              | TCB-420 35     | TCB-420 70      |
|-------------------------|--------------------------------------------------|-----------------|------------------|--------------------------|-----------------|-------------------------------------------------------------------------|----------------|-----------------|
| internal Ø / Flat strip | 35                                               | 70              | 105              | 20 x 30                  | 50 x 80         | 25                                                                      | 35             | 70              |
| a<br>b<br>c             |                                                  | 79<br>100<br>33 | 110<br>130<br>33 | 146<br>170<br>33         | 110<br>89<br>58 | 145<br>114<br>50                                                        | 87<br>70<br>70 | 79<br>166<br>33 |
| A                       | 10...28 V <sub>dc</sub> supply, Output 4...20 mA |                 |                  |                          |                 | Output internal supply 4...20 mA (230 V <sub>ac</sub> Auxiliary supply) |                |                 |
| 2,5                     | [*] M70811                                       |                 |                  |                          |                 | [2] M71041                                                              | [3] M71011     |                 |
| 5                       | [*] M70812                                       |                 |                  | [*] M70211               |                 | [*] M71042                                                              | [*] M71012     |                 |
| 10                      | [*] M70813                                       |                 |                  | [*] M70212               |                 | [*] M71043                                                              | [*] M71013     |                 |
| 20                      | [*] M70814                                       |                 |                  | [*] M70213               |                 | [*] M71044                                                              | [*] M71014     |                 |
| 50                      | [*] M70815                                       |                 |                  | [*] M70214               |                 | [*] M71045                                                              | [*] M71015     |                 |
| 100                     | [*] M70816    [*] M70821                         |                 |                  | [*] M70215    [*] M70221 |                 | [*] M71046                                                              | [*] M71016     | [*] M71021      |
| 200                     |                                                  |                 |                  | [*] M70216               |                 | [*] M71047                                                              |                |                 |
| 250                     | [*] M70817    [*] M70822    [1] M70831           |                 |                  | [*] M70217    [*] M70222 |                 |                                                                         | [*] M71017     | [*] M71022      |
| 300                     |                                                  |                 |                  |                          |                 |                                                                         |                |                 |
| 500                     | [*] M70823    [1] M70832                         |                 |                  | [*] M70218    [*] M70223 |                 |                                                                         | [*] M71023     |                 |
| 750                     | [*] M70824    [1] M70833                         |                 |                  | [*] M70224               |                 |                                                                         | [*] M71024     |                 |
| 1 000                   | [1] M70834                                       |                 |                  |                          |                 |                                                                         |                |                 |
| 1 500                   | [1] M70835                                       |                 |                  |                          |                 |                                                                         |                |                 |

For higher currents use transformer + transducer

**CVM BD, Power analyler, DIN rail**
**CVM BD series - DIN Rail (8 modules) - 230 V<sub>ac</sub> supply**

|                                                                                  | Type           | Code       | Relay output | 4...20 mA output | Internal memory | Communication |
|----------------------------------------------------------------------------------|----------------|------------|--------------|------------------|-----------------|---------------|
| <b>CVM BD - Measurement voltage 500 V<sub>ph-n</sub> / 866 V<sub>ph-ph</sub></b> |                |            |              |                  |                 |               |
|                                                                                  | CVM BD-420-8-H | [*] M52105 | -            | 8                | -               | -             |

## CODIFICATION TABLE

## Narrow section transducers

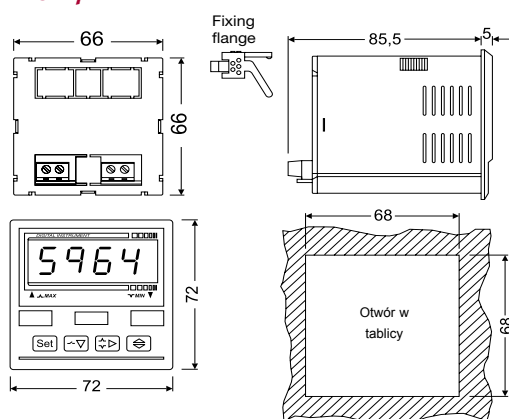
| Code                             |                        | Internal code |   |   |   |   | Delivery time |
|----------------------------------|------------------------|---------------|---|---|---|---|---------------|
|                                  |                        | M             | 2 | X | X | X |               |
|                                  |                        |               |   |   |   |   |               |
| Voltage<br>CVE-A                 | Standard (300 V)       | 0             |   |   |   |   | -             |
|                                  | 110 V                  | 1             |   |   |   |   | 2             |
|                                  | 400 V                  | 2             |   |   |   |   | 2             |
|                                  | 500 V                  | 3             |   |   |   |   | 2             |
|                                  | 690 V                  | 4             |   |   |   |   | 2             |
| Voltage<br>CVE-A-AP              | Standard (230 V)       | 0             |   |   |   |   | -             |
|                                  | 110 V                  | 1             |   |   |   |   | 2             |
|                                  | 400 V                  | 2             |   |   |   |   | 2             |
| Current                          | Standard (5 A)         | 0             |   |   |   |   | -             |
|                                  | 1 A                    | 1             |   |   |   |   | 2             |
|                                  | 10 A                   | 4             |   |   |   |   | 2             |
| Frequency                        | Standard (45...55 Hz)  | 0             |   |   |   |   | -             |
|                                  | 55...65 Hz             | 1             |   |   |   |   | 2             |
|                                  | 47...53 Hz             | 2             |   |   |   |   | 2             |
|                                  | 45...65 Hz             | 3             |   |   |   |   | 2             |
|                                  | 0...100 Hz             | 4             |   |   |   |   | 2             |
|                                  | 380...420 Hz           | 5             |   |   |   |   | 2             |
|                                  | 360...440 Hz           | 6             |   |   |   |   | 2             |
| CVE-A,<br>CCE-A,<br>CFE          | Standard (4...20 mA)   | 0             |   |   |   |   | -             |
|                                  | 0...20 mA              | 1             |   |   |   |   | 2             |
|                                  | 0...10 V               | 2             |   |   |   |   | 2             |
|                                  | 2...10 V               | 3             |   |   |   |   | 2             |
| CVE-A-AP,<br>CCE-A-AP,<br>CFE-AP | Standard (0...20 mA)   | 0             |   |   |   |   | -             |
|                                  | 0...10 V               | 1             |   |   |   |   | 2             |
| Auxiliary<br>supply              | Standard (220...240 V) | 0             |   |   |   |   | -             |
|                                  | 380...400 Vca 40/60 Hz | 3             |   |   |   |   | 2             |
|                                  | 18...36 Vdc            | 7             |   |   |   |   | 2             |
| Net. voltage                     | Standard (230 V)       | 0             | 0 | 0 | 2 |   |               |
|                                  | 110 V                  | 0             | 1 | 2 |   |   |               |
| CFE-AP)                          | 400 V                  | 0             | 2 | 2 |   |   |               |

## Transducers

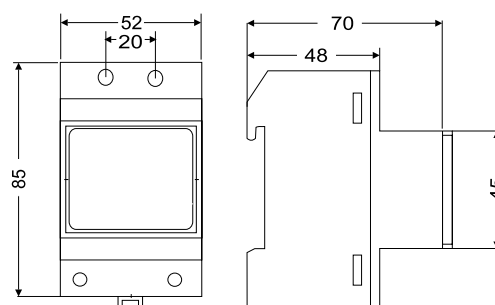
| Code                                    |                           | Internal code |   |   |   |   | Delivery time |
|-----------------------------------------|---------------------------|---------------|---|---|---|---|---------------|
|                                         |                           | M             | 2 | X | X | X |               |
|                                         |                           |               |   |   |   |   |               |
| AC Voltage                              | Standard (300 V)          | 0             |   |   |   |   | -             |
|                                         | 110 V                     | 1             |   |   |   |   | 1             |
|                                         | 400 V                     | 2             |   |   |   |   | 1             |
|                                         | 500 V                     | 3             |   |   |   |   | 1             |
|                                         | 690 V                     | 4             |   |   |   |   | 1             |
| AC Current                              | Standard (5 A)            | 0             |   |   |   |   | -             |
|                                         | 1 A                       | 1             |   |   |   |   | 1             |
|                                         | 10 A                      | 4             |   |   |   |   | 1             |
| DC Voltage                              | Standard (10 V)           | 0             |   |   |   |   | -             |
|                                         | 60 mV                     | 1             |   |   |   |   | 1             |
|                                         | 1 V                       | 2             |   |   |   |   | 1             |
|                                         | 100 V                     | 3             |   |   |   |   | 1             |
| DC Current                              | 500 V                     | 4             |   |   |   |   | 1             |
|                                         | Standard (20 mA)          | 0             |   |   |   |   | -             |
|                                         | 200 mA                    | 1             |   |   |   |   | 1             |
|                                         | 1 A                       | 2             |   |   |   |   | 1             |
| Power, power<br>factor, cos φ<br>(V, A) | 10 A                      | 3             |   |   |   |   | 1             |
|                                         | 300 V, .../5 A            | N             |   |   |   |   | 1             |
|                                         | 110 V, .../5 A            | 1             |   |   |   |   | 1             |
|                                         | 400 V, .../5 A            | 2             |   |   |   |   | 1             |
|                                         | 500 V, .../5 A            | 3             |   |   |   |   | 1             |
|                                         | 600 V, .../5 A            | 4             |   |   |   |   | 1             |
|                                         | 300 V, .../1 A            | 5             |   |   |   |   | 1             |
|                                         | 110 V, .../1 A            | 6             |   |   |   |   | 1             |
|                                         | 400 V, .../1 A            | 7             |   |   |   |   | 1             |
| Leakage current, process universal      | 500 V, .../1 A            | 8             |   |   |   |   | 1             |
|                                         | 600 V, .../1 A            | 9             |   |   |   |   | 1             |
|                                         | Standard (20 Ω)           | 0             |   |   |   |   | -             |
|                                         | 200 Ω                     | 1             |   |   |   |   | 1             |
| Resistance                              | 2 kΩ                      | 2             |   |   |   |   | 1             |
|                                         | 20 kΩ                     | 3             |   |   |   |   | 1             |
|                                         | Standard (-200...+200 °C) | 0             |   |   |   |   | -             |
| Temperature                             | -200...+800 °C            | 1             |   |   |   |   | 1             |
|                                         | Standard (45...55 Hz)     | 0             |   |   |   |   | -             |
| Frequency                               | 55...65 Hz                | 1             |   |   |   |   | 1             |
|                                         | 47...53 Hz                | 2             |   |   |   |   | 1             |
|                                         | 57...63 Hz                | 3             |   |   |   |   | 1             |
|                                         | 0...100 Hz                | 4             |   |   |   |   | 1             |
| Outputs 1, 3                            | Standard (20 mA)          | 0             |   |   |   |   | -             |
|                                         | 0...1 mA                  | 1             |   |   |   |   | 1             |
|                                         | 0...10 mA                 | 2             |   |   |   |   | 1             |
|                                         | 2 V                       | 3             |   |   |   |   | 1             |
|                                         | 5 V                       | 4             |   |   |   |   | 1             |
|                                         | 0...10 V                  | 5             |   |   |   |   | 1             |
|                                         | -20...0...20 mA           | 6             |   |   |   |   | 1             |
|                                         | -10...0...10 V            | 7             |   |   |   |   | 1             |
|                                         | -5...0...5 V              | 8             |   |   |   |   | 1             |
| Outputs 2                               | Standard (4...20 mA)      | 0             |   |   |   |   | -             |
|                                         | 2...10 V                  | 2             |   |   |   |   | 1             |
| Auxiliary<br>supply                     | Standard (220...240 V)    | 0             |   |   |   |   | -             |
|                                         | 100...120 Vac             | 1             |   |   |   |   | 2             |
|                                         | 380...400 Vca 40/60 Hz    | 3             |   |   |   |   | 2             |
|                                         | 18...36 Vdc               | 7             |   |   |   |   | 2             |
|                                         | 40...170 Vdc              | 9             |   |   |   |   | 2             |

## Dimensions

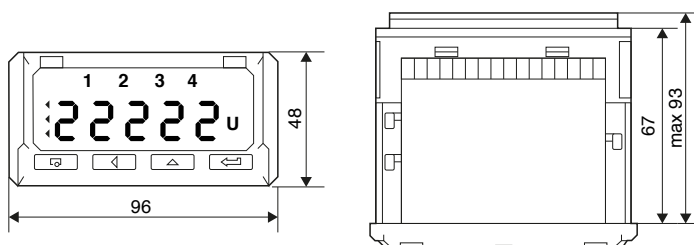
### DC B 72



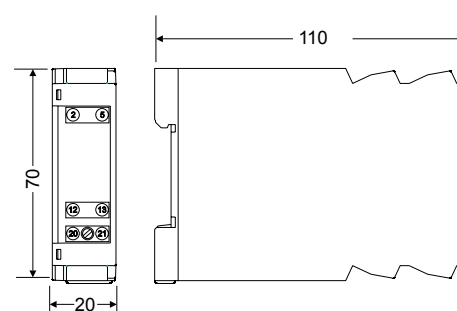
### DM 45



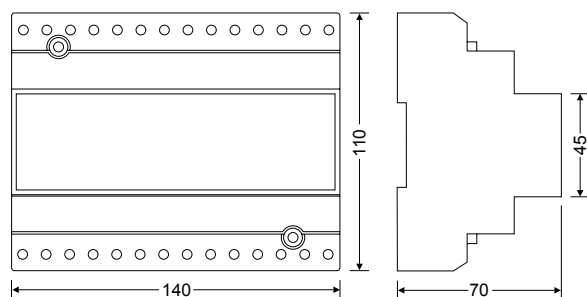
### DHB



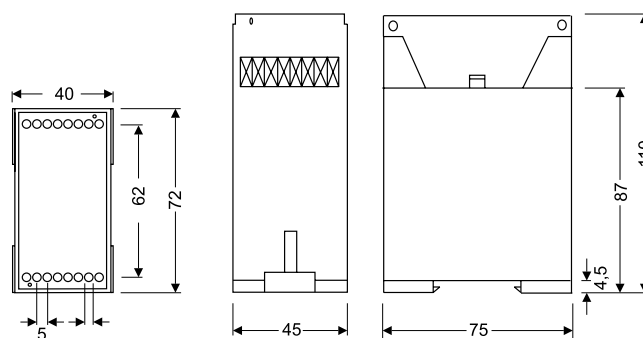
### CVE / CEE / CCE / CFE



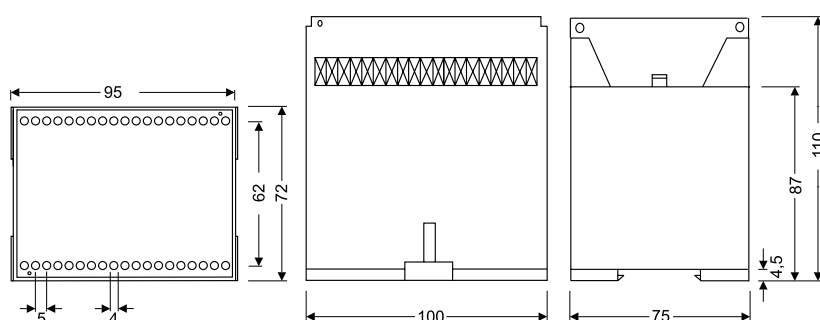
### CVM BD/BDM



### CV-A / CV-D / CC-A / CC-D / CR2 / CT-PT100 / CUP / CF



### CW / CY / CPF / CCOS / CFD



Analogue instrument selection table

|                    | Measurement system | Assembly                                                                            | Specifications                                                                      | Range                           | Size mm                              | Accuracy class                       | Scale angle                          | Scale extension                      | Type   |     |    |
|--------------------|--------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------|-----|----|
| Ammeters           | AC                 |    | Miliammeter                                                                         | 100...600 mA                    | 48 x 48, 72 x 72, 96 x 96, 144 x 144 | 1,5                                  | 90°                                  | P2                                   | EC     |     |    |
|                    | -                  |                                                                                     | 5...100 A, .../5A                                                                   | 72 x 72, 96 x 96                | EC                                   |                                      |                                      |                                      |        |     |    |
|                    | -                  |                                                                                     | .../5A                                                                              |                                 | EZC                                  |                                      |                                      |                                      |        |     |    |
|                    | With switch        |                                                                                     | .../5A                                                                              |                                 | EC FA                                |                                      |                                      |                                      |        |     |    |
|                    | With relays        |                                                                                     | .../5A                                                                              | 96 x 96                         | CEC                                  |                                      |                                      |                                      |        |     |    |
|                    | DIN rail           | -                                                                                   | 5...60 A, .../5A                                                                    | 85 x 52                         | 90°                                  |                                      | P2                                   | EM 45                                |        |     |    |
|                    | CC                 |    | -                                                                                   | 5...60 A, .../60 mV             |                                      |                                      | 48 x 48, 72 x 72, 96 x 96, 144 x 144 | P1                                   | BC     |     |    |
|                    | With relays        |                                                                                     | ... / 60 mV                                                                         | 96 x 96                         |                                      |                                      | CBC                                  |                                      |        |     |    |
|                    | DIN rail           |                                                                                     | -                                                                                   | 5...60 A, .../60 mV             |                                      |                                      | 85 x 52                              |                                      | BM 45  |     |    |
|                    | Voltmeters         | AC                                                                                  |    | -                               |                                      |                                      | 150 ... 600 V, .../110 V             | 48 x 48, 72 x 72, 96 x 96, 144 x 144 | 1,5    | 90° | P1 |
| -                  |                    | 250 V, 500 V                                                                        |                                                                                     | 72 x 72, 96 x 96                | EZC                                  |                                      |                                      |                                      |        |     |    |
| -                  |                    | 150 ... 600 V                                                                       |                                                                                     |                                 | EC F                                 |                                      |                                      |                                      |        |     |    |
| With relays        |                    | 150 ... 600 V, .../110 V                                                            |                                                                                     |                                 | 96 x 96                              | CEC                                  |                                      |                                      |        |     |    |
| DIN rail           |                    | -                                                                                   |                                                                                     | 300 V, 500 V, .../110 V         | 85 x 52                              | EM 45                                |                                      |                                      |        |     |    |
| CC                 |                    |  | -                                                                                   | 0...600 V                       | 48 x 48, 72 x 72, 96 x 96, 144 x 144 | 90°                                  | P1                                   | BC                                   |        |     |    |
| With relays        |                    |                                                                                     | ... / 60 mV                                                                         | 96 x 96                         | P1                                   |                                      | CBC                                  |                                      |        |     |    |
| DIN rail           |                    |                                                                                     | -                                                                                   | 15...150 V                      | 85 x 52                              |                                      | BM45                                 |                                      |        |     |    |
| Process indicators |                    | CC                                                                                  |  | -                               | 0...10 V, 0/4... 20 mA               | 48 x 48, 72 x 72, 96 x 96, 144 x 144 | 1,5                                  | 90°                                  |        | P1  | BC |
|                    |                    | -                                                                                   |                                                                                     | 0...10 V, 4... 20 mA, .../60 mV | 240°                                 |                                      |                                      | P1                                   |        | ZC  |    |
|                    | DIN rail           | -                                                                                   |                                                                                     | 0...10 V, 0/4... 20 mA          | 85 x 52                              |                                      |                                      | 90°                                  |        | BM  |    |
| Maximeters         | -                  | Panel                                                                               | Bimetallic                                                                          | .../5 A                         | 85 x 52                              | 3                                    |                                      | P1,2                                 | MC     |     |    |
|                    | Bimetallic + HM    |                                                                                     | P2                                                                                  |                                 |                                      |                                      |                                      | EMC                                  |        |     |    |
|                    | -                  | DIN rail                                                                            | Bimetallic                                                                          |                                 |                                      |                                      |                                      | P1,2                                 | MMC 45 |     |    |
| Sheet              | Needle             | Panel                                                                               | -                                                                                   | 45...65 Hz depending type       | 48 x 48, 72 x 72, 96 x 96, 144 x 144 | 0,5                                  | 90°                                  |                                      | HC     |     |    |
|                    |                    |                                                                                     | -                                                                                   |                                 | 96 x 96, 144 x 144                   |                                      | 240°                                 |                                      | HZC    |     |    |
|                    |                    | DIN rail                                                                            | -                                                                                   |                                 | 85 x 52                              |                                      | 90°                                  |                                      | -      | HM  |    |
|                    | Sheets             | Panel                                                                               | -                                                                                   |                                 | 72 x 72, 96 x 96, 144 x 144          |                                      | -                                    |                                      |        | HLC |    |
| Wattmeter          | Panel              | Single-phase                                                                        | 400 V, .../5 A                                                                      | 96 x 96, 144 x 144              | 1,5                                  | 90°                                  | P1                                   | WMC                                  |        |     |    |
| Three-phase        | WTC                |                                                                                     |                                                                                     |                                 |                                      |                                      |                                      |                                      |        |     |    |
| Varmeter           | Panel              | Single-phase                                                                        | 400 V, .../5 A                                                                      | 96 x 96, 144 x 144              | 1,5                                  | 90°                                  | P1                                   | YMC                                  |        |     |    |
| Three-phase        | YTC                |                                                                                     |                                                                                     |                                 |                                      |                                      |                                      |                                      |        |     |    |
| Phase-meters       | Electronic         | Panel                                                                               | Single-phase                                                                        | cos φ 0,5 - 1 - 0,5             | 96 x 96, 144 x 144                   | 1,5                                  | 90°                                  | P1                                   | FEMC   |     |    |
|                    |                    |                                                                                     | Three-phase                                                                         |                                 |                                      |                                      |                                      |                                      | FETC   |     |    |
|                    |                    |                                                                                     | Single-phase                                                                        |                                 |                                      |                                      |                                      |                                      | FMZ    |     |    |
|                    |                    |                                                                                     | Three-phase                                                                         |                                 |                                      |                                      |                                      |                                      | FTZ    |     |    |
|                    | Induction          |                                                                                     | Single-phase                                                                        | cos φ 0 - 1 - 0                 |                                      |                                      | 90°                                  |                                      |        | PIC |    |
|                    |                    |                                                                                     | Three-phase                                                                         | cos φ 0 - 1 - 0                 |                                      |                                      |                                      |                                      |        | PIC |    |

# Analogue instruments

## EC / EM / EZC / CEC, Moving Iron Miliammeters and Ammeter

Miliammeters and Ammeters, 90° - P2 - Class 1,5



| Type        |            |            |            |            |            |
|-------------|------------|------------|------------|------------|------------|
|             | EC 48      | EC 72      | EC 96      | EC 144     | EM 45      |
| a           | 48         | 72         | 96         | 144        | 85         |
| b           | 48         | 72         | 96         | 144        | 52         |
| c           | 86,2       | 69,2       | 69,2       | 91,8       | 65         |
| mA          |            |            |            |            |            |
| 100         | [1] M10111 | [1] M10121 | [1] M10131 | [1] M10141 | [1] M10151 |
| 150         | [1] M10112 | [1] M10122 | [1] M10132 | [1] M10142 | [1] M10152 |
| 250         | [1] M10114 | [1] M10124 | [1] M10134 | [1] M10144 | [1] M10154 |
| 300         | [1] M10115 | [1] M10125 | [1] M10135 | [1] M10145 | [1] M10155 |
| 400         | [1] M10116 | [1] M10126 | [1] M10136 | [1] M10146 | [1] M10156 |
| 500         | [1] M10117 | [1] M10127 | [1] M10137 | [1] M10147 | [1] M10157 |
| 600         | [1] M10118 | [1] M10128 | [1] M10138 | [1] M10148 | [1] M10158 |
| A           |            |            |            |            |            |
| 5           | [*] M10212 | [*] M10222 | [*] M10232 | [3] M10242 | [1] M10252 |
| 10          | [*] M10213 | [*] M10223 | [*] M10233 | [3] M10243 | [*] M10253 |
| 15          | [*] M10214 | [*] M10224 | [*] M10234 | [3] M10244 | [*] M10254 |
| 20          | [*] M10215 | [*] M10225 | [*] M10235 | [3] M10245 | [1] M10255 |
| 25          | [*] M10216 | [*] M10226 | [*] M10236 | [3] M10246 | [*] M10256 |
| 30          | [*] M10217 | [*] M10227 | [1] M10237 | [3] M10247 | [*] M10257 |
| 40          | [*] M10218 | [*] M10228 | [*] M10238 | [3] M10248 | [*] M10258 |
| 50          | [*] M10219 | [*] M10229 | [*] M10239 | [3] M10249 | [3] M10259 |
| 60          | [*] M1021A | [*] M1022A | [*] M1023A | [3] M1024A | [3] M1025A |
| 75          | -          | [*] M1022B | [1] M1023B | [3] M1024B | -          |
| 100         | -          | [*] M1022C | [*] M1023C | [3] M1024C | -          |
| .../5 A (*) | [*] M10210 | [*] M10220 | [*] M10230 | [3] M10240 | [*] M10250 |

(\*) Exchangeable scales. See next page.

|                 | Ammeters, 240° |            | Ammeters with phase switch |            | Ammeters with 2 relays |
|-----------------|----------------|------------|----------------------------|------------|------------------------|
| Type            |                |            |                            |            |                        |
| Class           | 5              |            | 1,5                        |            | 1,5                    |
| Scale           | 240°, P2       |            | 90°, P1                    |            | 90°, P2                |
| a               | 72             | 96         | 72                         | 96         | 96                     |
| b               | 72             | 96         | 72                         | 96         |                        |
| c               | 69,2           | 69,2       | 69,2                       | 69,2       | 85,3 96                |
| A               |                |            |                            |            |                        |
| (*) .../5 A (*) | [3] M10920     | [3] M10930 | [*] M10521                 | [*] M10531 | [*] M14810             |

(\*) Exchangeable scales. See next page.

(\*) Specify primary current of the measuring transformer

Exchangeable scales, moving iron ammeters

| Type      | SEC 48     | SEC 72     | SEC 96     | SEM 45     | SEC 72 FA  | SEC 96 FA  | SEZC 72    | SEZC 96    |
|-----------|------------|------------|------------|------------|------------|------------|------------|------------|
| Equipment | EC 48      | EC 72      | EC 96      | EM 45      | EC 72 FA   | EC 96 FA   | EZC 72     | EZC 96     |
| <b>A</b>  |            |            |            |            |            |            |            |            |
| 5/5       | [*] M102Z2 | [*] M102Y2 | [*] M102X2 | -          | -          | -          | [2] M109Y2 | [*] M109X2 |
| 10/5      | [*] M102Z3 | [*] M102Y3 | [*] M102X3 | -          | -          | -          | [*] M109Y3 | [*] M109X3 |
| 15/5      | [*] M102Z4 | [*] M102Y4 | [*] M102X4 | -          | -          | -          | [*] M109Y4 | [*] M109X4 |
| 20/5      | [*] M102Z5 | [*] M102Y5 | [*] M102X5 | -          | -          | -          | [*] M109Y5 | [*] M109X5 |
| 25/5      | [*] M102Z6 | [*] M102Y6 | [*] M102X6 | -          | -          | -          | [*] M109Y6 | [*] M109X6 |
| 30/5      | [*] M102Z7 | [*] M102Y7 | [*] M102X7 | -          | -          | -          | [*] M109Y7 | [*] M109X7 |
| 40/5      | [*] M102Z8 | [*] M102Y8 | [*] M102X8 | -          | -          | -          | [*] M109Y8 | [2] M109X8 |
| 50/5      | [*] M102Z9 | [*] M102Y9 | [*] M102X9 | [*] M102V9 | [*] M105Y9 | [*] M105X9 | [*] M109Y9 | [2] M109X9 |
| 60/5      | [*] M102ZA | [*] M102YA | [*] M102XA | [*] M102VA | [2] M105YA | [*] M105XA | [*] M109YA | [*] M109XA |
| 75/5      | [*] M102ZB | [*] M102YB | [*] M102XB | [*] M102VB | [*] M105YB | [*] M105XB | [*] M109YB | [*] M109XB |
| 100/5     | [*] M102ZC | [*] M102YC | [*] M102XC | [*] M102VC | [*] M105YC | [*] M105XC | [2] M109YC | [2] M109XC |
| 125/5     | [*] M102ZD | [*] M102YD | [*] M102XD | [*] M102VD | [2] M105YD | [*] M105XD | [*] M109YD | [*] M109XD |
| 150/5     | [*] M102ZE | [*] M102YE | [*] M102XE | [*] M102VE | [*] M105YE | [2] M105XE | [2] M109YE | [2] M109XE |
| 200/5     | [*] M102ZF | [*] M102YF | [*] M102XF | [*] M102VF | [*] M105YF | [*] M105XF | [2] M109YF | [2] M109XF |
| 250/5     | [*] M102ZG | [*] M102YG | [*] M102XG | [1] M102VG | [*] M105YG | [*] M105XG | [2] M109YG | [2] M109XG |
| 300/5     | [*] M102ZH | [*] M102YH | [*] M102XH | [*] M102VH | [*] M105YH | [*] M105XH | [2] M109YH | [*] M109XH |
| 400/5     | [*] M102ZJ | [*] M102YJ | [*] M102XJ | [*] M102VJ | [*] M105YJ | [*] M105XJ | [*] M109YJ | [2] M109XJ |
| 500/5     | [2] M102ZK | [*] M102YK | [*] M102XK | [*] M102VK | [*] M105YK | [*] M105XK | [*] M109YK | [*] M109XK |
| 600/5     | [*] M102ZL | [*] M102YL | [*] M102XL | [*] M102VL | [*] M105YL | [*] M105XL | [*] M109YL | [2] M109XL |
| 750/5     | [*] M102ZM | [*] M102YM | [*] M102XM | [*] M102VM | [*] M105YM | [*] M105XM | [*] M109YM | [2] M109XM |
| 800/5     | [*] M102ZN | [*] M102YN | [*] M102XN | [*] M102VN | [*] M105YN | [*] M105XN | [*] M109YN | [*] M109XN |
| 1 000/5   | [*] M102ZP | [*] M102YP | [*] M102XP | [1] M102VP | [*] M105YP | [*] M105XP | [*] M109YP | [2] M109XP |
| 1 200/5   | [*] M102ZQ | [*] M102YQ | [*] M102XQ | [1] M102VQ | [*] M105YQ | [*] M105XQ | [*] M109YQ | [*] M109XQ |
| 1 500/5   | [*] M102ZR | [*] M102YR | [*] M102XR | [1] M102VR | [*] M105YR | [*] M105XR | [2] M109YR | [*] M109XR |
| 2 000/5   | [*] M102ZS | [*] M102YS | [*] M102XS | [1] M102VS | [*] M105YS | [*] M105XS | [*] M109YS | [2] M109XS |
| 2 500/5   | [*] M102ZT | [*] M102YT | [*] M102XT | [1] M102VT | [*] M105YT | [*] M105XT | [*] M109YT | [*] M109XT |
| 3 000/5   | [*] M102ZU | [*] M102YU | [*] M102XU | [1] M102VU | [*] M105YU | [*] M105XU | [*] M109YU | [2] M109XU |
| 4 000/5   | [*] M102ZV | [*] M102YV | [*] M102XV | [1] M102VV | [*] M105YV | [*] M105XV | [*] M109YV | [2] M109XV |
| 5 000/5   | [*] M102ZW | [2] M102YW | [*] M102XW | [1] M102VW | [*] M105YW | [*] M105XW | [*] M109YW | [*] M109XW |

## CODIFICATION TABLE

## EC, EZC

| Code          |      | Internal code |   |   | Delivery time |
|---------------|------|---------------|---|---|---------------|
| M             | 1    | X             | X | X |               |
| Adjustment    |      |               |   |   |               |
|               |      |               |   |   |               |
|               |      |               |   |   |               |
| Current input |      |               |   |   |               |
|               |      |               |   |   |               |
| Scales(*)     | 1    |               |   |   | 2             |
|               | 5    |               |   |   | 2             |
|               | 10   |               |   |   | 2             |
|               | 15   |               |   |   | 2             |
|               | 20   |               |   |   | 2             |
|               | 25   |               |   |   | 2             |
|               | 30   |               |   |   | 2             |
|               | 40   |               |   |   | 2             |
|               | 50   |               |   |   | 2             |
|               | 60   |               |   |   | 2             |
|               | 75   |               |   |   | 2             |
|               | 100  |               |   |   | 2             |
|               | 125  |               |   |   | 2             |
|               | 150  |               |   |   | 2             |
|               | 200  |               |   |   | 2             |
|               | 250  |               |   |   | 2             |
|               | 300  |               |   |   | 2             |
|               | 400  |               |   |   | 2             |
|               | 500  |               |   |   | 2             |
|               | 600  |               |   |   | 2             |
|               | 750  |               |   |   | 2             |
|               | 800  |               |   |   | 2             |
|               | 1000 |               |   |   | 2             |
|               | 1200 |               |   |   | 2             |
|               | 1500 |               |   |   | 2             |
|               | 2000 |               |   |   | 2             |
|               | 2500 |               |   |   | 2             |
|               | 3000 |               |   |   | 2             |
|               | 4000 |               |   |   | 2             |
|               | 5000 |               |   |   | 2             |

## EC (mA), EM (mA)

| Code          |                    | Internal code |   |   | Delivery time |
|---------------|--------------------|---------------|---|---|---------------|
| M             | 1                  | X             | X | X |               |
| Adjustment    |                    |               |   |   |               |
|               |                    |               |   |   |               |
|               |                    |               |   |   |               |
| Current input |                    |               |   |   |               |
|               |                    |               |   |   |               |
| Scales        | 60                 |               |   |   | -             |
|               | 75                 |               |   |   | -             |
|               | 100                |               |   |   | -             |
|               | 125                |               |   |   | -             |
|               | 150                |               |   |   | -             |
|               | 200                |               |   |   | -             |
|               | 250                |               |   |   | -             |
|               | 300                |               |   |   | -             |
|               | 400                |               |   |   | -             |
|               | 500                |               |   |   | -             |
|               | 600                |               |   |   | -             |
|               | 750                |               |   |   | -             |
|               | 800                |               |   |   | -             |
|               | 1000               |               |   |   | -             |
|               | 1200               |               |   |   | -             |
|               | 1500               |               |   |   | -             |
|               | 2000               |               |   |   | -             |
|               | 2500               |               |   |   | -             |
|               | 3000               |               |   |   | -             |
|               | Standard (.../5 A) |               |   |   | -             |
|               | ... / 1 A          |               |   |   | 1             |
|               | /10 A              |               |   |   | 1             |

## SEC, SEM, EM

| Code          |                    | Internal code |   |   | Delivery time |
|---------------|--------------------|---------------|---|---|---------------|
| M             | 1                  | X             | X | X |               |
| Adjustment    |                    |               |   |   |               |
|               |                    |               |   |   |               |
|               |                    |               |   |   |               |
| Current input |                    |               |   |   |               |
|               |                    |               |   |   |               |
| Scales        | 60                 |               |   |   | -             |
|               | 75                 |               |   |   | -             |
|               | 100                |               |   |   | -             |
|               | 125                |               |   |   | -             |
|               | 150                |               |   |   | -             |
|               | 200                |               |   |   | -             |
|               | 250                |               |   |   | -             |
|               | 300                |               |   |   | -             |
|               | 400                |               |   |   | -             |
|               | 500                |               |   |   | -             |
|               | 600                |               |   |   | -             |
|               | 750                |               |   |   | -             |
|               | 800                |               |   |   | -             |
|               | 1000               |               |   |   | -             |
|               | 1200               |               |   |   | -             |
|               | 1500               |               |   |   | -             |
|               | 2000               |               |   |   | -             |
|               | 2500               |               |   |   | -             |
|               | 3000               |               |   |   | -             |
|               | Standard (.../5 A) |               |   |   | -             |
|               | ... / 1 A          |               |   |   | 1             |
|               | /10 A              |               |   |   | 1             |

## EC FA

| Code          |                    | Internal code |   |   | Delivery time |
|---------------|--------------------|---------------|---|---|---------------|
| M             | 1                  | X             | X | X |               |
| Adjustment    |                    |               |   |   |               |
|               |                    |               |   |   |               |
|               |                    |               |   |   |               |
| Current input |                    |               |   |   |               |
|               |                    |               |   |   |               |
| Scales        | 60                 |               |   |   | -             |
|               | 75                 |               |   |   | -             |
|               | 100                |               |   |   | -             |
|               | 125                |               |   |   | -             |
|               | 150                |               |   |   | -             |
|               | 200                |               |   |   | -             |
|               | 250                |               |   |   | -             |
|               | 300                |               |   |   | -             |
|               | 400                |               |   |   | -             |
|               | 500                |               |   |   | -             |
|               | 600                |               |   |   | -             |
|               | 750                |               |   |   | -             |
|               | 800                |               |   |   | -             |
|               | 1000               |               |   |   | -             |
|               | 1200               |               |   |   | -             |
|               | 1500               |               |   |   | -             |
|               | 2000               |               |   |   | -             |
|               | 2500               |               |   |   | -             |
|               | 3000               |               |   |   | -             |
|               | Standard (.../5 A) |               |   |   | -             |
|               | ... / 1 A          |               |   |   | 1             |
|               | /10 A              |               |   |   | 1             |

## CEC

| Code          |                    | Internal code |   |   | Delivery time |
|---------------|--------------------|---------------|---|---|---------------|
| M             | 1                  | X             | X | X |               |
| Adjustment    |                    |               |   |   |               |
|               |                    |               |   |   |               |
|               |                    |               |   |   |               |
| Current input |                    |               |   |   |               |
|               |                    |               |   |   |               |
| Scales        | 60                 |               |   |   | -             |
|               | 75                 |               |   |   | -             |
|               | 100                |               |   |   | -             |
|               | 125                |               |   |   | -             |
|               | 150                |               |   |   | -             |
|               | 200                |               |   |   | -             |
|               | 250                |               |   |   | -             |
|               | 300                |               |   |   | -             |
|               | 400                |               |   |   | -             |
|               | 500                |               |   |   | -             |
|               | 600                |               |   |   | -             |
|               | 750                |               |   |   | -             |
|               | 800                |               |   |   | -             |
|               | 1000               |               |   |   | -             |
|               | 1200               |               |   |   | -             |
|               | 1500               |               |   |   | -             |
|               | 2000               |               |   |   | -             |
|               | 2500               |               |   |   | -             |
|               | 3000               |               |   |   | -             |
|               | Standard (.../5 A) |               |   |   | -             |
|               | ... / 1 A          |               |   |   | 1             |
|               | /10 A              |               |   |   | 1             |



## EC / EM / EZC / CEC, Moving Iron Voltmeters

| Voltmeters, 90°                                                                     |                                                                                   |            |            |            | Voltmeters, 90°                                                                    | Voltmeters, 240°                                                                    |            |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------|------------|------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------|
| Type                                                                                |  |            |            |            |  |  |            |
|                                                                                     | EC 48                                                                             | EC 72      | EC 96      | EC 144     | EM 45                                                                              | EZC 72                                                                              | EZC 96     |
| Class                                                                               | 1,5                                                                               |            |            |            | 1,5                                                                                | 5                                                                                   |            |
| Scale                                                                               | 90°, P1                                                                           |            |            |            | 90°, P1                                                                            | 240°, P1                                                                            |            |
| a  | 48                                                                                | 72         | 96         | 144        | 85                                                                                 | 72                                                                                  | 96         |
| b                                                                                   | 48                                                                                | 72         | 96         | 144        | 52                                                                                 | 72                                                                                  | 96         |
| c                                                                                   | 86,2                                                                              | 69,2       | 69,2       | 91,8       | 65                                                                                 | 69,2                                                                                | 69,2       |
| V                                                                                   |                                                                                   |            |            |            |                                                                                    |                                                                                     |            |
| 250                                                                                 | [*] M10415                                                                        | [*] M10425 | [*] M10435 | [3] M10445 | -                                                                                  | [3] M11125                                                                          | [3] M11135 |
| 300                                                                                 | [*] M10416                                                                        | [*] M10426 | [*] M10436 | [3] M10446 | [*] M10456                                                                         | -                                                                                   | -          |
| 400                                                                                 | [1] M10417                                                                        | [1] M10427 | [1] M10437 | [3] M10447 | -                                                                                  | -                                                                                   | -          |
| 500                                                                                 | [*] M10418                                                                        | [*] M10428 | [*] M10438 | [3] M10448 | [*] M10458                                                                         | [3] M11128                                                                          | [3] M11138 |
| 600                                                                                 | [1] M10419                                                                        | [*] M10429 | [1] M10439 | [3] M10449 | -                                                                                  | -                                                                                   | -          |
| .../110 V(*)                                                                        | [1] M10410                                                                        | [*] M10420 | [*] M10430 | [3] M10440 | [1] M10450                                                                         | -                                                                                   | -          |

(\*) Exchangeable scales, Voltmeters 90°

| Voltmeters with phases switch                                                         |                                                                                     |             |                    |                | Voltmeters with 2 relays                                                              |            |
|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------|--------------------|----------------|---------------------------------------------------------------------------------------|------------|
| Type                                                                                  |  |             |                    |                |  |            |
|                                                                                       | Three-phase 3 wire                                                                  |             | Three-phase 4 wire |                | with sequence meter                                                                   |            |
|                                                                                       | EC 72 F III                                                                         | EC 96 F III | EC 72 F III +N     | EC 96 F III +N | EC 96 FN-S                                                                            | CEC 96     |
| Class                                                                                 | 1,5                                                                                 |             |                    |                |                                                                                       | 1,5        |
| Scale                                                                                 | 90°, P1                                                                             |             |                    |                |                                                                                       | 90°, P1    |
| a  | 72                                                                                  | 96          | 72                 | 96             | 96                                                                                    | 96         |
| b                                                                                     | 72                                                                                  | 96          | 72                 | 96             | 96                                                                                    | 96         |
| c                                                                                     | 69,2                                                                                | 69,2        | 69,2               | 69,2           | 69,2                                                                                  | 85,3       |
| V                                                                                     |                                                                                     |             |                    |                |                                                                                       |            |
| 150                                                                                   | -                                                                                   | -           | -                  | -              | -                                                                                     | [3] M14821 |
| 250                                                                                   | [*] M10625                                                                          | [3] M10635  | [3] M10725         | [3] M10735     | -                                                                                     | [3] M14822 |
| 300                                                                                   | [*] M10626                                                                          | [*] M10636  | [*] M10726         | [*] M10736     | -                                                                                     | [3] M14823 |
| 400                                                                                   | [*] M10627                                                                          | [3] M10637  | [*] M10727         | [3] M10737     | -                                                                                     | [3] M14824 |
| 500                                                                                   | [*] M10628                                                                          | [*] M10638  | [*] M10728         | [*] M10738     | [2] M11038                                                                            | [3] M14825 |
| 600                                                                                   | [*] M10629                                                                          | [3] M10639  | [2] M10729         | [3] M10739     | -                                                                                     | [3] M14826 |
| (1).../110 V                                                                          | -                                                                                   | [2] M10632  | -                  | -              | -                                                                                     | [3] M14820 |

(1) Specify primary voltage of the measuring transformers

Exchangeable scales, moving iron voltmeters, 1,2P

| Type       | SEC 48     | SEC 72     | SEC 96     | SEM 45     |
|------------|------------|------------|------------|------------|
| Equipment  | EC 48      | EC 72      | EC 96      | EM 45      |
| <b>V</b>   |            |            |            |            |
| 1 000/110  | [1] M104Z1 | [1] M104Y1 | [1] M104X1 | [1] M104V1 |
| 3 300/110  | [1] M104Z2 | [1] M104Y2 | [1] M104X2 | [1] M104V2 |
| 6 600/110  | [1] M104Z3 | [1] M104Y3 | [1] M104X3 | [1] M104V3 |
| 13 200/110 | [1] M104Z4 | [1] M104Y4 | [1] M104X4 | [1] M104V4 |
| 15 000/110 | [1] M104Z5 | [1] M104Y5 | [1] M104X5 | [1] M104V5 |
| 20 000/110 | [1] M104Z6 | [1] M104Y6 | [1] M104X6 | [1] M104V6 |
| 22 000/110 | [1] M104Z7 | [1] M104Y7 | [1] M104X7 | [1] M104V7 |
| 25 000/110 | [1] M104Z8 | [1] M104Y8 | [1] M104X8 | [1] M104V8 |

CODIFICATION TABLE

EC Voltmeters with external transformer and EZC

| Code                                                         | Internal code        |   |   |               |
|--------------------------------------------------------------|----------------------|---|---|---------------|
| M 1 X X X X 0 0                                              | X                    | X | X |               |
|                                                              |                      |   |   | Delivery time |
| Adjustment                                                   | Standard 1,2P        | 0 |   | -             |
|                                                              | 1P                   | 1 |   | 2             |
| Voltage input                                                | Standard (.../110 V) | 0 |   | -             |
|                                                              | ... / 100 V          | 1 |   | 1             |
|                                                              | ... / 63,5 V         | 2 |   | 1             |
|                                                              | ... / 57,8 V         | 3 |   | 1             |
| Scales (For equipments with external transformer and all EC) | 1000                 | 1 | 2 |               |
|                                                              | 3300                 | 2 | 2 |               |
|                                                              | 6600                 | 3 | 2 |               |
|                                                              | 13200                | 4 | 2 |               |
|                                                              | 15000                | 5 | 2 |               |
|                                                              | 20000                | 6 | 2 |               |
|                                                              | 22000                | 7 | 2 |               |
|                                                              | 25000                | 8 | 2 |               |

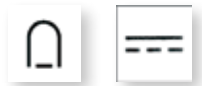
EC and EC-F direct Voltmeters

| Code            | Internal code |   |  |               |
|-----------------|---------------|---|--|---------------|
| M 1 X X X X 0 0 | X             |   |  |               |
|                 |               |   |  | Delivery time |
| Adjustment      | Standard 1P   | 0 |  | -             |
|                 | 1,2P          | 2 |  | 2             |

EC scales and EM Voltmeters and scales

| Code            | Internal code        |   |  |               |
|-----------------|----------------------|---|--|---------------|
| M 1 X X X X 0 0 | X                    | X |  |               |
|                 |                      |   |  | Delivery time |
| Adjustment      | Standard 1,2P        | 0 |  | -             |
|                 | 1P                   | 1 |  | 2             |
| Voltage inputs  | Standard (.../110 V) | 0 |  | -             |
|                 | ... / 100 V          | 1 |  | 1             |
|                 | ... / 63,5 V         | 2 |  | 1             |
|                 | ... / 57,8 V         | 3 |  | 1             |

## BC / BM / CBC, Moving coil ammeters



| Ammeters, 90° |            |            |            |            | Ammeters, 90° |  | ammeters with 2 relays |  |
|---------------|------------|------------|------------|------------|---------------|--|------------------------|--|
|               |            |            |            |            |               |  |                        |  |
| Type          | BC 48      | BC 72      | BC 96      | BC 144     | BM 45         |  | CBC 96                 |  |
| Class         | 1,5        |            |            |            | 1,5           |  | 1,5                    |  |
| Scale         | 90°, P1    |            |            |            | 90°, P1       |  | 90°, P1                |  |
| a             | 48         | 72         | 96         | 144        | 85            |  | 96                     |  |
| b             | 48         | 72         | 96         | 144        | 52            |  | 96                     |  |
| c             | 86,2       | 69,2       | 69,2       | 91,8       | 65            |  | 85,3                   |  |
|               |            |            |            |            |               |  |                        |  |
| 5             | [3] M11412 | [*] M11422 | [3] M11432 | [3] M11442 | [3] M11452    |  | -                      |  |
| 10            | [3] M11413 | [*] M11423 | [3] M11433 | [3] M11443 | [*] M11453    |  | -                      |  |
| 25            | [*] M11416 | [*] M11426 | [*] M11436 | [3] M11446 | [3] M11456    |  | -                      |  |
| 50            | [3] M11419 | [*] M11429 | [3] M11439 | [3] M11449 | [*] M11459    |  | -                      |  |
| 60            | -          | [3] M1142A | [3] M1143A | [3] M1144A | -             |  | -                      |  |
| .../60 mV(*)  | [*] M11410 | [*] M11420 | [*] M11430 | [3] M11440 | [3] M11450    |  | [3] M14830             |  |

(\*) Exchangeable scales. See M.7 for external shunts

## Exchangeable Scales

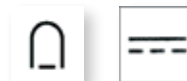
| Type   | SBC 48     | SBC 72     | SBC 96     | SBM 45     | Type     | SBC 48     | SBC 72     | SBC 96     | SBM 45     |
|--------|------------|------------|------------|------------|----------|------------|------------|------------|------------|
| Device | BC 48      | BC 72      | BC 96      | BM 45      | Device   | BC 48      | BC 72      | BC 96      | BM 45      |
| A / mV |            |            |            |            | A / mV   |            |            |            |            |
| 50/60  | [1] M114Z9 | [*] M114Y9 | [*] M114X9 | [1] M114V9 | 300/60   | [1] M114ZH | [1] M114YH | [1] M114XH | [1] M114VH |
| 60/60  | [1] M114ZA | [1] M114YA | [1] M114XA | [1] M114VA | 400/60   | [1] M114ZJ | [1] M114YJ | [*] M114XJ | [1] M114VJ |
| 75/60  | [1] M114ZB | [1] M114YB | [1] M114XB | [1] M114VB | 600/60   | [1] M114ZL | [*] M114YL | [*] M114XL | [1] M114VL |
| 100/60 | [1] M114ZC | [*] M114YC | [*] M114XC | [1] M114VC | 1 000/60 | [1] M114ZP | [1] M114YP | [*] M114XP | [1] M114VP |
| 150/60 | [1] M114ZE | [1] M114YE | [1] M114XE | [1] M114VE | 1 500/60 | [1] M114ZR | [1] M114YR | [1] M114XR | [1] M114VR |
| 200/60 | [1] M114ZF | [*] M114YF | [*] M114XF | [1] M114VF | 2 500/60 | [1] M114ZT | [1] M114YT | [1] M114XT | [1] M114VT |
| 250/60 | [1] M114ZG | [1] M114YG | [1] M114XG | [1] M114VG |          |            |            |            |            |

## CODIFICATION TABLE

| BC and BM ammeter |                      |               |   |   |   |   |   |               |   |
|-------------------|----------------------|---------------|---|---|---|---|---|---------------|---|
| Code              |                      | Internal code |   |   |   |   |   | Delivery time |   |
| M                 | 1                    | X             | X | X | X | 0 | 0 | X             | X |
|                   |                      |               |   |   |   |   |   | ↑             | ↑ |
| Adjustment        | Standard             |               |   |   |   |   | 0 | ↑             | - |
|                   | central zero         |               |   |   |   |   | 1 | ↑             | 2 |
| Shunt input range | Standard (.../60 mV) |               |   |   |   |   | 0 | ↑             | - |
|                   | ... / 50 mV          |               |   |   |   |   | 1 | ↑             | 2 |
|                   | ... / 150 mV         |               |   |   |   |   | 3 | ↑             | 2 |
|                   |                      |               |   |   |   | 5 | ↑ | 2             |   |
| Scale             |                      |               |   |   |   |   | 9 | ↑             | 2 |
|                   |                      |               |   |   |   |   | A | ↑             | 2 |
|                   |                      |               |   |   |   |   | B | ↑             | 2 |
|                   |                      |               |   |   |   |   | C | ↑             | 2 |
|                   |                      |               |   |   |   |   | E | ↑             | 2 |
|                   |                      |               |   |   |   |   | F | ↑             | 2 |
|                   |                      |               |   |   |   |   | G | ↑             | 2 |
|                   |                      |               |   |   |   |   | H | ↑             | 2 |
|                   |                      |               |   |   |   |   | J | ↑             | 2 |
|                   |                      |               |   |   |   |   | K | ↑             | 2 |
|                   |                      |               |   |   |   |   | L | ↑             | 2 |
|                   |                      |               |   |   |   |   | P | ↑             | 2 |
|                   |                      |               |   |   |   |   | R | ↑             | 2 |
|                   |                      |               |   |   |   |   | T | ↑             | 2 |

| SBC, SBM45 scales |                      |               |   |   |   |   |   |               |   |
|-------------------|----------------------|---------------|---|---|---|---|---|---------------|---|
| Code              |                      | Internal code |   |   |   |   |   | Delivery time |   |
| M                 | 1                    | X             | X | X | X | 0 | 0 | X             | X |
|                   |                      |               |   |   |   |   |   | ↑             | ↑ |
| Adjustment        | Standard             |               |   |   |   |   | 0 | ↑             | - |
|                   | central zero         |               |   |   |   |   | 1 | ↑             | 2 |
| Shunt input range | Standard (.../60 mV) |               |   |   |   |   | 0 | ↑             | - |
|                   | ... / 50 mV          |               |   |   |   |   | 1 | ↑             | 2 |
|                   | ... / 150 mV         |               |   |   |   |   | 3 | ↑             | 2 |
|                   |                      |               |   |   |   | 5 | ↑ | 2             |   |

## BC / BM / CBC, Moving coil voltmeters



| Voltmeters, 90° |            |            |            |            | Voltmeters, 90° | Voltmeters with relay |
|-----------------|------------|------------|------------|------------|-----------------|-----------------------|
| Type            |            |            |            |            |                 |                       |
| Class           | 1,5        |            |            |            | 1,5             | 1,5                   |
| Scale           | 90°, P1    |            |            |            | 90°, P1         | 90°, P1               |
| a               | 48         | 72         | 96         | 144        | 85              | 96                    |
| b               | 48         | 72         | 96         | 144        | 52              | 96                    |
| c               | 86,2       | 69,2       | 69,2       | 91,8       | 65              | 85,3                  |
| V               |            |            |            |            |                 |                       |
| 0...10 V (*1)   | [*] M11813 | [*] M11823 | [*] M11833 | [3] M11843 | -               | -                     |
| 1               | [3] M11711 | [1] M11721 | [1] M11731 | [3] M11741 | -               | -                     |
| 15              | [*] M11714 | [*] M11724 | [*] M11734 | [3] M11744 | [3] M11754      | -                     |
| 30              | [*] M11716 | [*] M11726 | [*] M11736 | [3] M11746 | [3] M11755      | -                     |
| 60              | [*] M11718 | [*] M11728 | [*] M11738 | [3] M11748 | [3] M11756      | -                     |
| 100             | [3] M11719 | [*] M11729 | [*] M11739 | [3] M11749 | [3] M11757      |                       |
| 150             | [3] M1171A | [*] M1172A | [*] M1173A | [3] M1174A | [*] M11758      | [3] M14841            |
| 250             | [3] M1171B | [*] M1172B | [*] M1173B | [3] M1174B | -               | [3] M14842            |
| 300             | -          | -          | -          | -          | -               | [3] M14843            |
| 400             | [3] M1171D | [*] M1172D | [*] M1173D | [3] M1174D | -               | [3] M14844            |
| 500             | [3] M1171E | [*] M1172E | [1] M1173E | [3] M1174E | -               | [3] M14845            |
| 600             | [3] M1171F | [1] M1172F | [1] M1173F | [3] M1174F | [3] M1175F      | [3] M14846            |

(\*1) Scale NOT included

### CODIFICATION TABLE

| BC and BM equipment |   |   |   |   |               |   |   |   |  |
|---------------------|---|---|---|---|---------------|---|---|---|--|
| Code                |   |   |   |   | Internal code |   |   |   |  |
| M                   | 1 | X | X | X | X             | 0 | 0 | X |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
|                     |   |   |   |   |               |   |   |   |  |
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## BC / BM / ZC, Process indicators



## Process indicators, 90°

|           |                  |                  |                  |                    |                |
|-----------|------------------|------------------|------------------|--------------------|----------------|
| Type      |                  |                  |                  |                    |                |
|           | BC 48            | BC 72            | BC 96            | BC 144             | BM 45          |
| Class     | 1,5              |                  |                  |                    |                |
| Scale     | 90°, P1          |                  |                  |                    |                |
|           | 48<br>48<br>86,2 | 72<br>72<br>69,2 | 96<br>96<br>69,2 | 144<br>144<br>91,8 | 85<br>52<br>65 |
| Scope     |                  |                  |                  |                    |                |
| 0...10 V  | [*] M11813       | [*] M11823       | [*] M11833       | [3] M11843         | [3] M11853     |
| 0...20 mA | [1] M11812       | [1] M11822       | [1] M11832       | [3] M11842         | [3] M11852     |
| 4...20 mA | [*] M11811       | [*] M11821       | [*] M11831       | [3] M11841         | [3] M11851     |

Scales NOT included

## Exchangeable scales

|           |            |            |            |            |
|-----------|------------|------------|------------|------------|
| Type      | SIP 48     | SIP 72     | SIP 96     | SIPM 45    |
| Equipment | BC 48      | BC 72      | BC 96      | BM 45      |
| Scope     |            |            |            |            |
| 0...10 V  | [3] M118Z3 | [3] M118Y3 | [3] M118X3 | [1] M118V3 |
| 0...20 mA | [3] M118Z2 | [3] M118Y2 | [3] M118X2 | [1] M118V2 |
| 4...20 mA | [3] M118Z1 | [3] M118Y1 | [3] M118X1 | [1] M118V1 |

## Process indicators, 240°

|              |                  |                  |                    |
|--------------|------------------|------------------|--------------------|
| Type         |                  |                  |                    |
|              | ZC 72            | ZC 96            | ZC 144             |
| Class        | 1,5              |                  |                    |
| Scale        | 240°, P1         |                  |                    |
|              | 72<br>72<br>69,2 | 96<br>96<br>69,2 | 144<br>144<br>91,8 |
| Scope        |                  |                  |                    |
| 0...10 V     | [1] M12523       | [1] M12533       | [1] M12543         |
| 4...20 mA(*) | [1] M12521       | [1] M12531       | [1] M12541         |
| .../60 mV    | [1] M12520       | [1] M12530       | [1] M12540         |

(\*) Scale included in the price

The 6-digit code already includes the 4...20 mA scale

## CODIFICATION TABLE

BC and ZC process indicators

| Code       |              | Internal code |   |   | Delivery time |   |   |   |   |   |
|------------|--------------|---------------|---|---|---------------|---|---|---|---|---|
| M          | 1            | X             | X | X |               | 0 | 0 | X | X | X |
| Adjustment | Standard     |               |   |   |               | 0 |   |   |   | - |
|            | Central zero |               |   |   |               | 1 |   |   |   | 2 |
| Scale      | 1            |               |   |   |               |   | 1 |   |   | 2 |
|            | 5            |               |   |   |               |   | 2 |   |   | 2 |
|            | 10           |               |   |   |               |   | 3 |   |   | 2 |
|            | 15           |               |   |   |               |   | 4 |   |   | 2 |
|            | 20           |               |   |   |               |   | 5 |   |   | 2 |
|            | 25           |               |   |   |               |   | 6 |   |   | 2 |
|            | 30           |               |   |   |               |   | 7 |   |   | 2 |
|            | 40           |               |   |   |               |   | 8 |   |   | 2 |
|            | 50           |               |   |   |               |   | 9 |   |   | 2 |
|            | 60           |               |   |   |               |   | A |   |   | 2 |
|            | 75           |               |   |   |               |   | B |   |   | 2 |
|            | 100          |               |   |   |               |   | C |   |   | 2 |
|            | 125          |               |   |   |               |   | D |   |   | 2 |
|            | 150          |               |   |   |               |   | E |   |   | 2 |
|            | 200          |               |   |   |               |   | F |   |   | 2 |
|            | 250          |               |   |   |               |   | G |   |   | 2 |
|            | 300          |               |   |   |               |   | H |   |   | 2 |
|            | 400          |               |   |   |               |   | J |   |   | 2 |
|            | 500          |               |   |   |               |   | K |   |   | 2 |
|            | 600          |               |   |   |               |   | L |   |   | 2 |
|            | 750          |               |   |   |               |   | M |   |   | 2 |
|            | 800          |               |   |   |               |   | N |   |   | 2 |
|            | 1000         |               |   |   |               |   | P |   |   | 2 |
|            | 1200         |               |   |   |               |   | Q |   |   | 2 |
|            | 1500         |               |   |   |               |   | R |   |   | 2 |
| 2000       |              |               |   |   |               | S |   |   | 2 |   |
| 2500       |              |               |   |   |               | T |   |   | 2 |   |
| 3000       |              |               |   |   |               | U |   |   | 2 |   |
| 4000       |              |               |   |   |               | V |   |   | 2 |   |
| 5000       |              |               |   |   |               | W |   |   | 2 |   |
| Unit       | -            |               |   |   |               |   |   | 0 |   | 2 |
|            | mA           |               |   |   |               |   |   | 1 |   | 2 |
|            | A            |               |   |   |               |   |   | 2 |   | 2 |
|            | kA           |               |   |   |               |   |   | 3 |   | 2 |
|            | mV           |               |   |   |               |   |   | 4 |   | 2 |
|            | V            |               |   |   |               |   |   | 8 |   | 2 |
|            | kV           |               |   |   |               |   |   | 9 |   | 2 |
|            | rpm          |               |   |   |               |   |   | A |   | 2 |
|            | rpm x 1000   |               |   |   |               |   |   | B |   | 2 |
|            | l (litros)   |               |   |   |               |   |   | C |   | 2 |
|            | m            |               |   |   |               |   |   | G |   | 2 |
|            | m²           |               |   |   |               |   |   | H |   | 2 |
|            | m³           |               |   |   |               |   |   | J |   | 2 |
|            | %            |               |   |   |               |   |   | K |   | 2 |

(\*) Only for ZC equipments. 0 € for SIP scales

## MC / MMC / EMC, maximeter ammeters

| Bimetallic maximeter ammeter |                                                                                   |            |            |            | Bimetallic maximeter ammeters<br>+ moving iron ammeters                           |                                                                                     |            |            |      |
|------------------------------|-----------------------------------------------------------------------------------|------------|------------|------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------|------------|------|
| Type                         |  |            |            |            |  |  |            |            |      |
|                              | MC 48                                                                             | MC 72      | MC 96      | MC 144     | MMC 45                                                                            | EMC 72                                                                              | EMC 96     | EMC 144    |      |
| Class                        | 3                                                                                 |            |            |            |                                                                                   | Bimetallic: 3 Moving iron:1,5                                                       |            |            |      |
| Scale                        | 90° , P1,2                                                                        |            |            |            |                                                                                   | Double Scale 90°, P1,2, moving iron P2                                              |            |            |      |
| a                            |  | 48         | 72         | 96         | 144                                                                               | 85                                                                                  | 72         | 96         | 144  |
| b                            |                                                                                   | 48         | 72         | 96         | 144                                                                               | 52                                                                                  | 72         | 96         | 144  |
| c                            |                                                                                   | 86,2       | 69,2       | 69,2       | 91,8                                                                              | 65                                                                                  | 69,2       | 69,2       | 91,8 |
| A                            |                                                                                   |            |            |            |                                                                                   |                                                                                     |            |            |      |
| .../ 5 A                     | [1] M12211                                                                        | [*] M12221 | [*] M12231 | [3] M12241 | [*] M12651                                                                        | [*] M12622                                                                          | [*] M12632 | [3] M12642 |      |
| Scales NOT included          |                                                                                   |            |            |            |                                                                                   |                                                                                     |            |            |      |
| Scale                        | 120% 90° , P1,2                                                                   |            |            |            |                                                                                   |                                                                                     |            |            |      |
| .../ 5 A                     | [3] M15521                                                                        |            | [3] M15531 |            |                                                                                   |                                                                                     |            |            |      |
| Scale included               |                                                                                   |            |            |            |                                                                                   |                                                                                     |            |            |      |

## Exchangeable scales

| Type      | SMC 48     | SMC 72     | SMC 96     | SMMC 45-A  | SEMC 72    | SEMC 96    |
|-----------|------------|------------|------------|------------|------------|------------|
| Equipment | MC 48      | MC 72      | MC 96      | MMC 45     | EMC 72     | EMC 96     |
| A         |            |            |            |            |            |            |
| 100/5     | [1] M122ZC | [*] M122YC | [*] M122XC | [1] M126VC | [*] M126YC | [*] M126XC |
| 200/5     | [*] M122ZF | [*] M122YF | [*] M122XF | [1] M126VF | [*] M126YF | [*] M126XF |
| 300/5     | [*] M122ZH | [*] M122YH | [*] M122XH | [1] M126VH | [*] M126YH | [*] M126XH |
| 400/5     | [*] M122ZJ | [*] M122YJ | [*] M122XJ | [1] M126VJ | [*] M126YJ | [*] M126XJ |
| 500/5     | [*] M122ZK | [*] M122YK | [*] M122XK | [1] M126VK | [*] M126YK | [*] M126XK |
| 600/5     | [1] M122ZL | [3] M122YL | [*] M122XL | [1] M126VL | [3] M126YL | [*] M126XL |
| 750/5     | [1] M122ZM | [3] M122YM | [*] M122XM | [1] M126VM | [*] M126YM | [*] M126XM |
| 800/5     | [1] M122ZN | [*] M122YN | [*] M122XN | [1] M126VN | [*] M126YN | [*] M126XN |
| 1 000/5   | [1] M122ZP | [*] M122YP | [*] M122XP | [1] M126VP | [*] M126YP | [*] M126XP |
| 1 500/5   | [1] M122ZR | [*] M122YR | [*] M122XR | [1] M126VR | [*] M126YR | [*] M126XR |
| 2 000/5   | [1] M122ZS | [*] M122YS | [*] M122XS | [1] M126VS | [*] M126YS | [*] M126XS |

## CODIFICATION TABLE

## MC and EMC maximeters and SMC and SEMC scales

| M 1 X X X X 0 0 X X X |                    |               |   |  |
|-----------------------|--------------------|---------------|---|--|
| Code                  | Internal code      | Delivery time |   |  |
| Standard (15 minutes) | 0                  | -             |   |  |
| Adjustment            | 8 minutes          | 1             |   |  |
|                       | 30 minutes         | 2             |   |  |
| Current input         | Standard (.../5 A) | 0             |   |  |
|                       | .../ 1 A           | 1             |   |  |
| Scale                 | 100                | C             | 2 |  |
|                       | 125                | D             | 2 |  |
|                       | 150                | E             | 2 |  |
|                       | 200                | F             | 2 |  |
|                       | 250                | G             | 2 |  |
|                       | 300                | H             | 2 |  |
|                       | 400                | J             | 2 |  |
|                       | 500                | K             | 2 |  |
|                       | 600                | L             | 2 |  |
|                       | 750                | M             | 2 |  |
|                       | 800                | N             | 2 |  |
|                       | 1000               | P             | 2 |  |
|                       | 1200               | Q             | 2 |  |
|                       | 1500               | R             | 2 |  |
|                       | 2000               | S             | 2 |  |
|                       | 2500               | T             | 2 |  |
|                       | 3000               | U             | 2 |  |
|                       | 4000               | V             | 2 |  |
|                       | 5000               | W             | 2 |  |

## MMC 45 Maximeter

| M 1 X X X X 0 0 X     |               |               |  |  |
|-----------------------|---------------|---------------|--|--|
| Code                  | Internal code | Delivery time |  |  |
| Standard (15 minutes) | 0             | -             |  |  |
| Adjustment            | 8 minutes     | 1             |  |  |
|                       | 30 minutes    | 2             |  |  |

# HC / HM / HZC / HLC, Frequncymeters

| Pointer type frequencymeters, 90° , 230 V                                                        |                                                                                   |                  |                  |                    | Pointer type frequencymeters, 90 <sup>a</sup> , 230 V                               | Pointer type frequencymeters, 240 <sup>a</sup> , 230 V                              |                   |
|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------|------------------|--------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------|
|                 |  |                  |                  |                    |  |  |                   |
| Type                                                                                             | HC 48                                                                             | HC 72            | HC 96            | HC 144             | HM 45                                                                               | HZC 96                                                                              | HZC 144           |
| Class                                                                                            | 0,5                                                                               |                  |                  |                    | 0,5                                                                                 | 0,5                                                                                 |                   |
| Scale                                                                                            | 90°                                                                               |                  |                  |                    | 90°                                                                                 | 240°                                                                                |                   |
| <br>a<br>b<br>c | 48<br>48<br>86,2                                                                  | 72<br>72<br>69,2 | 96<br>96<br>69,2 | 144<br>144<br>91,8 | 85<br>52<br>65                                                                      | 96<br>96<br>121.2                                                                   | 144<br>144<br>122 |
| 45...55 Hz                                                                                       | [*] M12711                                                                        | [*] M12721       | [*] M12731       | [3] M12741         | [2] M12751                                                                          | [1] M12831                                                                          | [1] M12841        |

## Reed type frequencymeters

|                                                                                                    |                                                                                    |                  |                    |
|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|------------------|--------------------|
|                   |  |                  |                    |
|                                                                                                    | Type                                                                               | HLC 72           | HLC 96             |
| Class                                                                                              | 0,5                                                                                |                  |                    |
| <br>a<br>b<br>c | 72<br>72<br>69,2                                                                   | 96<br>96<br>69,2 | 144<br>144<br>91,8 |
| Hz                                                                                                 |                                                                                    |                  |                    |
| 47...53, 13 reeds                                                                                  | [*] M12921                                                                         | [*] M12931       | [3] M12941         |

## CODIFICATION TABLE

| HC, HZC and HM frequencymeters |                       |   |   |
|--------------------------------|-----------------------|---|---|
| Code                           | Internal code         |   |   |
| M 1 X X X X 0 0 X X            |                       |   |   |
| Frequency                      | Standard (45...55 Hz) | 0 | - |
|                                | 57...63 Hz            | 1 | 2 |
|                                | 55...65 Hz            | 3 | 2 |
|                                | 45...65 Hz            | 4 | 2 |
|                                | 47...53 Hz            | 5 | 2 |
| Voltage                        | Standard (230 V)      | 0 | - |
|                                | 100 ... 120 V         | 1 | 2 |
|                                | 380 ... 400 V         | 3 | 2 |
|                                | 440 V                 | 4 | 2 |
|                                | (*) 380 ... 440 V     | 6 |   |

(\*) Only HC

| HLC frequencymeters    |                                  |   |   |
|------------------------|----------------------------------|---|---|
| Code                   | Internal code                    |   |   |
| M 1 X X X X 0 0 X X    |                                  |   |   |
| Frequency / Num. reeds | Standard (47...53 Hz / 13 reed.) | 0 | - |
|                        | 57...63 Hz / 13 reed.            | 1 | 2 |
|                        | 45...55 Hz / 11 reed.            | 2 | 2 |
|                        | 55...65 Hz / 11 reed.            | 3 | 2 |
|                        | 57...63 Hz / 7 reed.             | 4 | 2 |
|                        | 47...53 Hz / 7 reed.             | 5 | 2 |
|                        | 45...55 Hz / 21 reed.            | 6 | 2 |
|                        | 55...65 Hz / 21 reed.            | 7 | 2 |
| Voltage                | Standard (230 V)                 | 0 | - |
|                        | 100 ... 120 V                    | 1 | 2 |
|                        | 380 ... 400 V                    | 3 | 2 |
|                        | 440 V                            | 4 | 2 |

## WMC / WTC / YMC / YTC, Wattmeters and varmeters



## WATTMETERS, 45 ... 65 Hz

| Type                     |   |                    |                      |                    |                           |                    |                    |                    |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------------------|--------------------|---------------------------|--------------------|--------------------|--------------------|
|                          | Single-phase                                                                                                                                                        |                    | Balanced three-phase |                    | Three-phase 3 wire (ARON) |                    | Three-phase 4 wire |                    |
|                          | WMC 96                                                                                                                                                              | WMC 144            | WTC 96E              | WTC 144E           | WTC 96A                   | WTC 144A           | WTC 96AN           | WTC 144AN          |
| Class                    | 1,5                                                                                                                                                                 |                    |                      |                    |                           |                    |                    |                    |
| Scale                    | 90° P1                                                                                                                                                              |                    |                      |                    |                           |                    |                    |                    |
| a<br>b<br>c              | 96<br>96<br>69,2                                                                                                                                                    | 144<br>144<br>91,8 | 96<br>96<br>69,2     | 144<br>144<br>91,8 | 96<br>96<br>82,9          | 144<br>144<br>91,8 | 96<br>96<br>82,9   | 144<br>144<br>91,8 |
| U <sub>phase-phase</sub> | 400 V                                                                                                                                                               |                    | 400 V                |                    | 110 V (*)                 |                    | 400 V              |                    |
|                          | [*] M13031                                                                                                                                                          | [4] M13041         | [*] M13032           | [4] M13042         | [3] M13034                | [3] M13044         | [*] M13033         | [4] M13043         |
|                          |                                                                                                                                                                     |                    |                      |                    |                           |                    |                    |                    |

Exchangeable scales for the WMC 96, WTC 96E and WTC 96AN equipment. Scales NOT included  
 (\*) Specify primary voltage and current of the measuring transformers, and power at full scale

## Varmeters, 45 ... 65 Hz

| Type                     |   |                    |                      |                    |                           |                    |                    |                    |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------------------|--------------------|---------------------------|--------------------|--------------------|--------------------|
|                          | Single-phase                                                                                                                                                        |                    | Balanced three-phase |                    | Three-phase 3 wire (ARON) |                    | Three-phase 4 wire |                    |
|                          | YMC 96                                                                                                                                                              | YMC 144            | YTC 96E              | YTC 144E           | YTC 96A                   | YTC 144A           | YTC 96AN           | YTC 144AN          |
| Class                    | 1,5                                                                                                                                                                 |                    |                      |                    |                           |                    |                    |                    |
| Scale                    | 90 ° P1                                                                                                                                                             |                    |                      |                    |                           |                    |                    |                    |
| a<br>b<br>c              | 96<br>96<br>69,2                                                                                                                                                    | 144<br>144<br>91,8 | 96<br>96<br>69,2     | 144<br>144<br>91,8 | 96<br>96<br>82,9          | 144<br>144<br>91,8 | 96<br>96<br>82,9   | 144<br>144<br>91,8 |
| U <sub>phase-phase</sub> | 400 V                                                                                                                                                               |                    | 400 V                |                    | 110 V                     |                    | 400 V              |                    |
|                          | [3] M13231                                                                                                                                                          | [3] M13241         | [3] M13232           | [3] M13242         | [2] M13234                | [3] M13244         | [3] M13233         | [3] M13243         |
|                          |                                                                                                                                                                     |                    |                      |                    |                           |                    |                    |                    |

## Wattmeters and varmeters Exchangeable scales

| Type      | Single-phase |            |            | Three-phase |              |               |              |              |
|-----------|--------------|------------|------------|-------------|--------------|---------------|--------------|--------------|
|           |              | SWM 96     | SYM 96     |             | SWT 96E (*1) | SWT 96AN (*2) | SYT 96E (*1) | SYT 96AN(*2) |
| Equipment |              | WMC 96     | YMC 96     |             | WTC 96E      | WTC 96AN      | YTC 96E      | YTC 96AN     |
| A         | Full scale   | Code       | Code       | Full scale  | Code         | Code          | Code         | Code         |
| 50/5      | 20 kW        | [1] M130J9 | [1] M132J9 | 30 kW       | [1] M130K9   | [1] M130L9    | [1] M132K9   | [1] M132L9   |
| 75/5      | -            | -          | -          | 50 kW       | [1] M130KB   | [1] M130LB    | [1] M132KB   | [1] M132LB   |
| 100/5     | 40 kW        | [1] M130JC | [1] M132JC | 60 kW       | [1] M130KC   | [1] M130LC    | [1] M132KC   | [1] M132LC   |
| 150/5     | 60 kW        | [1] M130JE | [1] M132JE | 90 kW       | [1] M130KE   | [1] M130LE    | [1] M132KE   | [1] M132LE   |
| 200/5     | 80 kW        | [1] M130JF | [1] M132JF | 120 kW      | [1] M130KF   | [1] M130LF    | [1] M132KF   | [1] M132LF   |
| 300/5     | 120 kW       | [1] M130JH | [1] M132JH | 180 kW      | [1] M130KH   | [1] M130LH    | [1] M132KH   | [1] M132LH   |
| 400/5     | 160 kW       | [1] M130JJ | [1] M132JJ | 240 kW      | [1] M130KJ   | [1] M130LJ    | [1] M132KJ   | [1] M132LJ   |
| 500/5     | 200 kW       | [1] M130JK | [1] M132JK | 300 kW      | [1] M130KK   | [1] M130LK    | [1] M132KK   | [1] M132LK   |
| 600/5     | 240 kW       | [1] M130JL | [1] M132JL | 360 kW      | [1] M130KL   | [1] M130LL    | [1] M132KL   | [1] M132LL   |
| 1 000/5   | 400 kW       | [1] M130JP | [1] M132JP | 600 kW      | [1] M130KP   | [1] M130LP    | [1] M132KP   | [1] M132LP   |
| 1 500/5   | 600 kW       | [1] M130JR | [1] M132JR | 900 kW      | [1] M130KR   | [1] M130LR    | [1] M132KR   | [1] M132LR   |
| 2 000/5   | 800 kW       | [1] M130JS | [1] M132JS | 1,2 MW      | [1] M130KS   | [1] M130LS    | [1] M132KS   | [1] M132LS   |
| 3 000/5   | 1,2 MW       | [1] M130JU | [1] M132JU | 1,8 MW      | [1] M130KU   | [1] M130LU    | [1] M132KU   | [1] M132LU   |
| 4 000/5   | 1,6 MW       | [1] M130JV | [1] M132JV | 2,4 MW      | [1] M130KV   | [1] M130LV    | [1] M132KV   | [1] M132LV   |
| 5 000/5   | 2,0 MW       | [1] M130JW | [1] M132JW | 3 MW        | [1] M130KW   | [1] M130LW    | [1] M132KW   | [1] M132LW   |

(\*1) Balanced three-phase wattmeters and varmeters type WTC 93E and YTC 96E, 230 V, 400 V

(\*2) Unbalanced three-phase wattmeters and varmeters type WTC 96AN and YTC 96AN, 400 V

## CODIFICATION TABLE

## Wattmeters and Varmeters

| Code                                        |                                    | Código interno |   |  | Delivery time |
|---------------------------------------------|------------------------------------|----------------|---|--|---------------|
| M 1 X X X X 0 0 X X X                       |                                    |                |   |  |               |
| Current input                               | Standard ... / 5 A                 | 0              |   |  | -             |
|                                             | ... / 1 A                          | 1              |   |  | 2             |
| Voltage                                     | Standard (400 V <sub>ph-ph</sub> ) | 0              |   |  | -             |
|                                             | 110 V <sub>ph-ph</sub> (a)         | 1              |   |  | 2             |
|                                             | 230 V <sub>ph-ph</sub>             | 2              |   |  | 2             |
|                                             | 440 V <sub>ph-ph</sub>             | 5              |   |  | 2             |
|                                             | 460 V <sub>ph-ph</sub>             | 6              |   |  | 2             |
| Scale ranges<br>Primary current transformer | 50                                 |                | 9 |  | 2             |
|                                             | 75                                 |                | B |  | 2             |
|                                             | 100                                |                | C |  | 2             |
|                                             | 150                                |                | E |  | 2             |
|                                             | 200                                |                | F |  | 2             |
|                                             | 300                                |                | H |  | 2             |
|                                             | 400                                |                | J |  | 2             |
|                                             | 500                                |                | K |  | 2             |
|                                             | 600                                |                | L |  | 2             |
|                                             | 1000                               |                | P |  | 2             |
|                                             | 1500                               |                | R |  | 2             |
|                                             | 2000                               |                | S |  | 2             |
|                                             | 3000                               |                | U |  | 2             |
|                                             | 4000                               |                | V |  | 2             |
|                                             | 5000                               |                | W |  | 2             |

(a) In ARON unbalanced three-phase Wattmeters an Varmeters (3 wires), the standard voltage is 110 V

## Wattmeters and Varmeters scales

| Code                  |                    | Internal code |  |  | Delivery time |
|-----------------------|--------------------|---------------|--|--|---------------|
| M 1 X X X X 0 0 X X X |                    |               |  |  |               |
| Current input         | Standard ... / 5 A | 0             |  |  | -             |
|                       | ... / 1 A          | 1             |  |  | 2             |
| Voltages (V)          | Standard (400 V)   | 0             |  |  | -             |
|                       | 110 (a)            | 1             |  |  | 2             |
|                       | 230                | 2             |  |  | 2             |
|                       | 440                | 5             |  |  | 2             |
|                       | 460                | 6             |  |  | 2             |

(a) In ARON unbalanced three-phase Wattmeters an Varmeters (3 wires), the standard voltage is 110 V

# FEMC / FETC / FMZ / FTC / PIC, Phasemeters

| Electronic phasemeters, 90 °, 50 Hz |                 |            |                      |            | Electronic phasemeters, 240 °, 50 Hz |            |                      |            |
|-------------------------------------|-----------------|------------|----------------------|------------|--------------------------------------|------------|----------------------|------------|
|                                     |                 |            |                      |            |                                      |            |                      |            |
|                                     | Single-phase    |            | Balanced three-phase |            | Single-phase                         |            | Balanced three-phase |            |
|                                     | FEMC 96         | FEMC 144   | FETC 96              | FETC 144   | FMZ 96                               | FMZ 144    | FTZ 96               | FTZ 144    |
| Class                               | 1,5             |            |                      |            |                                      |            |                      |            |
| Scale                               | 90° P1          |            |                      |            | 240° P1                              |            |                      |            |
|                                     | 96              | 144        | 96                   | 144        | 96                                   | 144        | 96                   | 144        |
| a                                   | 96              | 144        | 96                   | 144        | 96                                   | 144        | 96                   | 144        |
| b                                   | 82,9            | 91,8       | 82,9                 | 91,8       | 121,2                                | 91,8       | 121,2                | 91,8       |
| c                                   |                 |            |                      |            |                                      |            |                      |            |
| V                                   | cos φ 0,5-1-0,5 |            |                      |            |                                      |            |                      |            |
| 100/√3                              | [1] M13431      | [3] M13441 | -                    | -          | [4] M13531                           | [4] M13541 | -                    | -          |
| 110/√3                              | [1] M13432      | [3] M13442 | -                    | -          | [4] M13532                           | [4] M13542 | -                    | -          |
| 100                                 | [1] M13433      | [3] M13443 | [1] M1343C           | [3] M1344C | [4] M13533                           | [4] M13543 | [4] M1353C           | [4] M1354C |
| 110                                 | [1] M13434      | [3] M13444 | [1] M1343D           | [3] M1344D | [4] M13534                           | [4] M13544 | [4] M1353D           | [4] M1354D |
| 230                                 | [1] M13435      | [3] M13445 | [3] M1343E           | [3] M1344E | [4] M13535                           | [4] M13545 | [4] M1353E           | [4] M1354E |
| 400                                 | [1] M13436      | [3] M13446 | [*] M1343F           | [3] M1344F | [4] M13536                           | [4] M13546 | [4] M1353F           | [4] M1354F |
| 440                                 | [1] M13437      | [3] M13447 | [1] M1343G           | [3] M1344G | [4] M13537                           | [4] M13547 | [4] M1353G           | [4] M1354G |
| 500                                 | [1] M13438      | [3] M13448 | [1] M1343H           | [3] M1344H | [4] M13538                           | [4] M13548 | [4] M1353H           | [4] M1354H |

Current range: from 0,1 to 1,2 In. To connect to .../ 5 A transformers. Electronic converter included.

| Induction phasemeters 360°, 50 Hz, 4 quadrants |              |            |                      |            |                        |            |
|------------------------------------------------|--------------|------------|----------------------|------------|------------------------|------------|
|                                                |              |            |                      |            |                        |            |
|                                                | Single-phase |            | Balanced three-phase |            | Unbalanced three-phase |            |
|                                                | PIC 96 A     | PIC 144 A  | PIC 96 B             | PIC 144 B  | PIC 96 E               | PIC 144 E  |
| Class                                          | 1,5          |            |                      |            |                        |            |
| Scale                                          | 360°, P1     |            |                      |            |                        |            |
|                                                | 96           | 144        | 96                   | 144        | 96                     | 144        |
| a                                              | 96           | 144        | 96                   | 144        | 96                     | 144        |
| b                                              | 121,2        | 122        | 121,2                | 122        | 121,2                  | 122        |
| c                                              |              |            |                      |            |                        |            |
| V                                              | cos φ 0-1-0  |            |                      |            |                        |            |
| 110                                            | [4] M13631   | [4] M13641 | [4] M13634           | [4] M13644 | [4] M13637             | [4] M13647 |
| 230                                            | [4] M13632   | [4] M13642 | [4] M13635           | [4] M13645 | [4] M13638             | [4] M13648 |
| 400                                            | [4] M13633   | [4] M13643 | [4] M13636           | [4] M13646 | [*] M13639             | [4] M13649 |

Current range: from 0,1 to 1,2 In. To connect to .../ 5 A transformers.

## CODIFICATION TABLE

| Electronic phasemeters |                   |   |   |  |  |               |
|------------------------|-------------------|---|---|--|--|---------------|
| Code                   | Internal code     |   |   |  |  |               |
| M 1 X X X X 0 0 X      |                   |   |   |  |  |               |
|                        |                   |   |   |  |  | Delivery time |
| Secondary current      | Standard .../ 5 A | 0 | - |  |  |               |
|                        | ... / 1 A         | 1 | 3 |  |  |               |

| Induction phasemeters |                   |   |   |  |  |               |
|-----------------------|-------------------|---|---|--|--|---------------|
| Code                  | Internal code     |   |   |  |  |               |
| M 1 X X X X 0 0 X X   |                   |   |   |  |  |               |
|                       |                   |   |   |  |  | Delivery time |
| Secondary current     | Standard .../ 5 A | 0 | - |  |  |               |
|                       | ... / 1 A         | 1 | 3 |  |  |               |

## PGR, Protection vatmeters

### Protective dual bidirectional wattmeter, 230 V

|                          |                 |                      |                           |                    |
|--------------------------|-----------------|----------------------|---------------------------|--------------------|
|                          |                 |                      |                           |                    |
|                          | Single-phase    | Balanced three-phase | Three-phase 3 wire (ARON) | Three-phase 4 wire |
| Type                     | PGR 96 M        | PGR 96E              | PGR 96A                   | PGR 96AN           |
| Converter                | CW-M            | CW-TE                | CW-TA                     | CW-TAN             |
| Class                    | 1,5             |                      |                           |                    |
| Scale                    | 90°, P2         |                      |                           |                    |
|                          | 96<br>96<br>110 |                      |                           |                    |
| 100/√3... 500 V .../ 5 A | [4] M14721      | -                    | -                         | -                  |
| 100...500 V .../5 A      | -               | [4] M14722           | [4] M14724                | [4] M14723         |
|                          |                 |                      |                           |                    |

MUST SELECT THE REST OF PARAMETERS ON THE BELOW TABLE

The instrument includes the analogue converter and indicator.

Specify the primary voltage and current of the current transformers, the full scale power value and main voltage.

Included and exchangeable scales. Standardized scales.

#### CODIFICATION TABLE

| PGR           |                        |               |   |
|---------------|------------------------|---------------|---|
| Code          |                        | Internal code |   |
| M             | 1                      | X             | X |
| X             | X                      | X             | X |
| 0             | 0                      | X             | X |
|               |                        | X             | X |
| Scale         | 50                     | 9             | - |
|               | 60                     | A             | 3 |
|               | 75                     | B             | 3 |
|               | 100                    | C             | 3 |
|               | 125                    | D             | 3 |
|               | 150                    | E             | 3 |
|               | 200                    | F             | 3 |
|               | 250                    | G             | 3 |
|               | 300                    | H             | 3 |
|               | 400                    | J             | 3 |
|               | 500                    | K             | 3 |
|               | 600                    | L             | 3 |
|               | 750                    | M             | 3 |
|               | 800                    | N             | 3 |
|               | 1000                   | P             | 3 |
|               | 1200                   | Q             | 3 |
|               | 1500                   | R             | 3 |
|               | 2000                   | S             | 3 |
|               | 2500                   | T             | 3 |
|               | 3000                   | U             | 3 |
|               | 4000                   | V             | 3 |
|               | 5000                   | W             | 3 |
| input current | Standard (.../ 5 A)    | 0             | - |
|               | .../ 1 A               | 1             | 3 |
| Power Supply  | Standard 220...240 V   | 0             | 2 |
|               | 380 ... 400 V 40/60 Hz | 3             | 3 |

**2EC / 2HC / 2HLC / SMC / STC / UC / SynchroMAX, Synchronization and marine applications equipment**
**2EC, Double voltmeters**

|             |            |            |
|-------------|------------|------------|
|             |            |            |
|             | 2 EC 96    | 2 EC 144   |
| Type        |            |            |
| Class       | 1,5        |            |
| Scale       | 90°        |            |
|             | 96         | 144        |
|             | 96         | 144        |
|             | 69,2       | 91,8       |
| V           |            |            |
| 2 x .../100 | [3] M13831 | [4] M13841 |
| 2 x .../110 | [3] M13832 | [4] M13842 |
| 2 x 220     | [3] M13833 | [4] M13843 |
| 2 x 380     | [3] M13834 | [*] M13844 |
| 2 x 440     | [3] M13835 | [4] M13845 |

Specify voltage transformers

**2HC / 2HLC, Double frequencymeters**

| Pointer type, 230 V |            |            | Reed type, 400 v     |                       |
|---------------------|------------|------------|----------------------|-----------------------|
|                     |            |            |                      |                       |
|                     | 2 HC 96    | 2 HC 144   | 2 HLC 96             | 2 HLC 144             |
| Type                |            |            |                      |                       |
| Class               | 0,5        |            | 0,5                  |                       |
| Scale               | 90°        |            | -                    |                       |
|                     | 96         | 144        | 96                   | 144                   |
|                     | 96         | 144        | 96                   | 144                   |
|                     | 82,9       | 91,8       | 82,9                 | 91,8                  |
| Hz                  |            |            | Hz                   |                       |
| 45...55             | [3] M12732 | [4] M12742 | 47...53,<br>13 reeds | [*] M12932 [4] M12942 |

**SMC / STC, Synchrosopes, 50 Hz**

|       |              |            |             |            |
|-------|--------------|------------|-------------|------------|
|       |              |            |             |            |
|       | Single-phase |            | Three-phase |            |
| Type  | SMC 96       | SMC 144    | STC 96      | STC 144    |
| Class | 1,5          |            | 1,5         |            |
|       | 96           | 144        | 96          | 144        |
|       | 96           | 144        | 96          | 144        |
|       | 121,2        | 122        | 121,2       | 122        |
| V     |              |            |             |            |
| 110   | [3] M14431   | [4] M14441 | [*] M14435  | [4] M14445 |
| 230   | [3] M14432   | [4] M14442 | [3] M14436  | [4] M14446 |
| 400   | [3] M14433   | [4] M14443 | [*] M14437  | [4] M14447 |
| 500   | [3] M14434   | [4] M14444 | [3] M14438  | [4] M14448 |

**UC / CUC, Phase sequence indicators, 50 Hz**

|               |            |            |            |
|---------------|------------|------------|------------|
|               |            |            |            |
|               | UC 72      | UC 96      | CUC 96     |
| Type          |            |            |            |
| Control Relay | No         |            | Yes        |
|               | 72         | 96         | 96         |
|               | 72         | 96         | 96         |
|               | 82,9       | 82,9       | 82,9       |
| V             |            |            |            |
| 100...150     | [1] M13726 | [1] M13736 | -          |
| 150...500     | [1] M13721 | [1] M13731 | -          |
| 230           | -          | -          | [3] M13754 |
| 400           | -          | -          | [*] M13755 |

**SynchroMAX, Synchronization equipment**

Power Supply 400 V

|               |              |                |
|---------------|--------------|----------------|
| Type          |              |                |
|               | SynchroMAX   | SynchroMAX PID |
| PID Control   | No           | Yes            |
|               | 96           |                |
|               | 96           |                |
|               | 82,9         |                |
| Frequency     | 30 ... 70 Hz |                |
| V Measurement |              |                |
| 30...150      | [*] M14624   | [*] M14634     |
| 110...600     | [*] M14625   | [4] M14635     |

Delivery time: [\*] immediate  
[x] working weeks  
[c] consult

## CH, Hour run meters

### Hour run meters

|                                                                                                                                   |                                                                                   |                  |                  |            |
|-----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------|------------------|------------|
|                                                  |  |                  |                  |            |
|                                                                                                                                   | Type                                                                              | CH 48            | CH 72            | CH 96      |
| Display                                                                                                                           | 5 + 2                                                                             |                  |                  |            |
| <div><div>a</div><div>b</div><div>c</div></div>  | 48<br>48<br>86,2                                                                  | 72<br>72<br>69,2 | 96<br>96<br>69,2 |            |
| Code                                                                                                                              | [3] M14911                                                                        | [3] M14921       | [3] M14931       | [3] M14951 |
| EUR                                                                                                                               |                                                                                   |                  |                  |            |

## MEG-1000, Insulation resistance meter

### Insulation resistance meter, 230 V (\*), 50...60 Hz

|                                                                                    |                                                                                     |          |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------|
|  |  |          |
|                                                                                    | Type                                                                                | MEG-1000 |
| Class                                                                              | 1,5                                                                                 |          |
| Scale                                                                              | 90°                                                                                 |          |
| Frequency                                                                          | 50...60 Hz                                                                          |          |
|  | a                                                                                   | 96       |
|                                                                                    | b                                                                                   | 96       |
|                                                                                    | c                                                                                   | 132      |
| Ω (double Scales)                                                                  | 0...500 kΩ<br>0.5...5 MΩ                                                            |          |
| Code                                                                               | [*] M15051                                                                          |          |

### CODIFICATION TABLE

|                                  |                   |
|----------------------------------|-------------------|
| 2 EC                             |                   |
| Code                             | Internal code     |
| M 1 X X X X 0 0 X                |                   |
|                                  | Delivery time     |
|                                  | 400 (640) 0 -     |
|                                  | 440 (700) 1 3     |
|                                  | 660 (1050) 2 3    |
|                                  | 1000 (1600) 3 3   |
|                                  | 1200 (1920) 4 3   |
|                                  | 2500 (4000) 5 3   |
|                                  | 3000 (4800) 6 3   |
|                                  | 3300 (5280) 7 3   |
|                                  | 4000 (6400) 8 3   |
|                                  | 5000 (8000) 9 3   |
| Nominal scale value (Full scale) | 5500 (8800) A 3   |
|                                  | 6600 (10560) B 3  |
|                                  | 7200 (11520) C 3  |
|                                  | 9000 (14400) D 3  |
|                                  | 10000 (16000) E 3 |
|                                  | 11000 (17600) F 3 |
|                                  | 12500 (20000) G 3 |
|                                  | 15000 (24000) H 3 |
|                                  | 20000 (32000) J 3 |
|                                  | 22000 (35200) K 3 |
|                                  | 24000 (38400) L 3 |
|                                  | 25000 (40000) M 3 |

### 2HC frequencymeters

|                     |                           |
|---------------------|---------------------------|
| Code                | Internal code             |
| M 1 X X X X 0 0 X X |                           |
|                     | Delivery time             |
| Frequency (Hz)      | Standard (45...55 Hz) 0 - |
|                     | 57...63 1 2               |
|                     | 55...65 3 2               |
|                     | 45...65 4 2               |
|                     | 47...53 5 2               |
| Voltage (V)         | Standard (230 V) 0 -      |
|                     | 100 ... 120 1 3           |
|                     | 380 ... 400 3 3           |
|                     | 440 4 3                   |

### SMC, STC, UC

|                   |                      |
|-------------------|----------------------|
| Code              | Internal code        |
| M 1 X X X X 0 0 X |                      |
|                   | Delivery time        |
| Frequency         | Standard (50 Hz) 0 - |
|                   | 60 Hz 1 3            |

### SynchroMAX

|                   |                      |
|-------------------|----------------------|
| Code              | Internal code        |
| M 1 X X X X 0 0 X |                      |
|                   | Delivery time        |
| Voltage supply    | Standard (400 V) 0 - |
|                   | 110 V 1 -            |
|                   | 230 V 2 -            |
|                   | 90...140 Vc.c C 2    |

### 2HLC

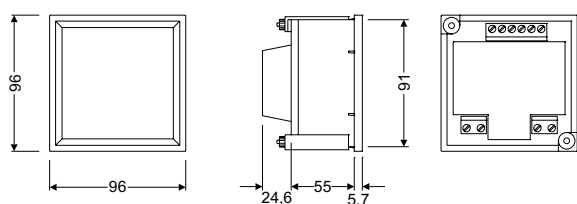
|                       |                                      |
|-----------------------|--------------------------------------|
| Code                  | Internal code                        |
| M 1 X X X X 0 0 X X   |                                      |
|                       | Delivery time                        |
| Frequency / No. reeds | Standard (47...53 Hz / 13 reed.) 0 - |
|                       | 57...63 Hz / 13 reed. 1 2            |
|                       | 45...55 Hz / 11 reed. 2 2            |
|                       | 55...65 Hz / 11 reed. 3 2            |
| Voltage               | Standard (400 V) 0 -                 |
|                       | 100 ... 120 V 1 2                    |
|                       | 440 V 4 2                            |
|                       | 380 ... 400 V 3 2                    |
|                       | 380 ... 440 V 6 2                    |

### CH

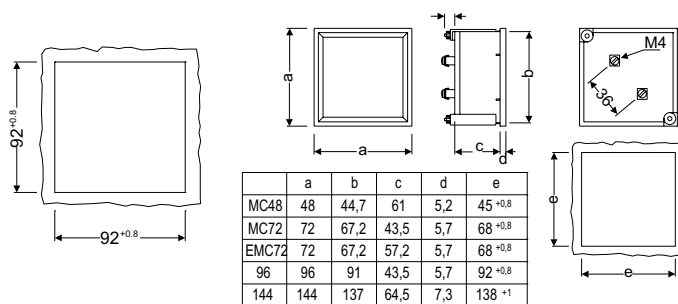
|                     |                      |
|---------------------|----------------------|
| Code                | Internal code        |
| M 1 X X X X 0 0 X X |                      |
|                     | Delivery time        |
| Frequency           | Standard 50 Hz 0 -   |
|                     | 60 Hz 1 2            |
| Voltage             | Standard (230 V) 0 - |
|                     | 24 Vc.a. 6 2         |
|                     | 110 Vc.a. 1 2        |
|                     | 10...80 Vc.c. 8 2    |
|                     | 80...200 Vc.c. A 2   |



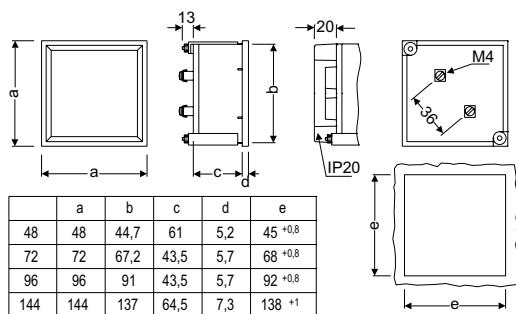
### CEC / CBC / PGR



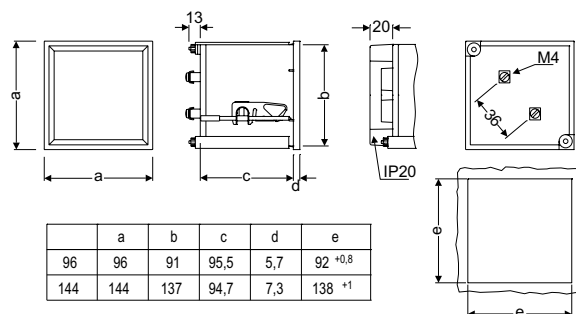
### EMC / MC



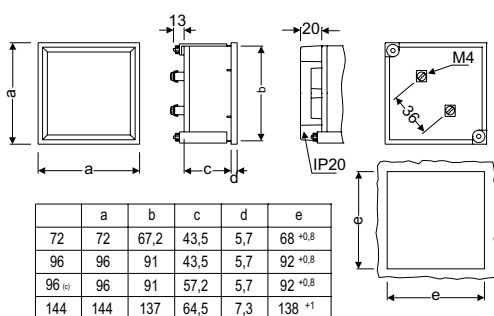
### HC



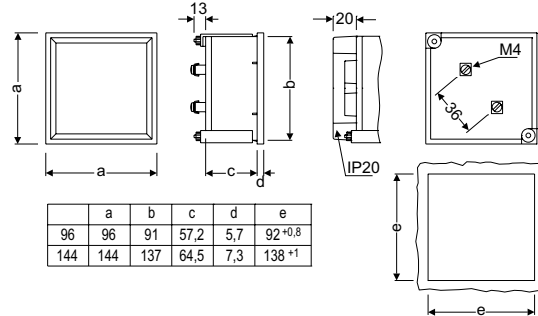
### HZC



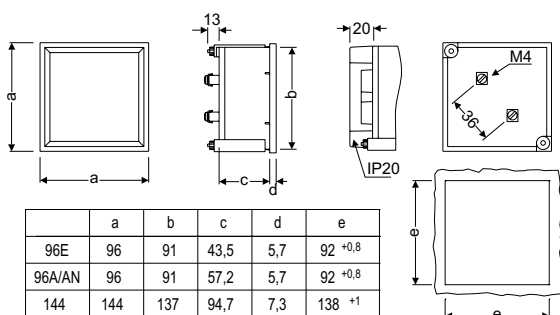
### HLC



### FEMC / FETC



### WMC / YTC



### FMZ / FTZ / PIC

