



I/O MFD 24VDC,Trans., 21 x PT100

**Part no.** MFD-TP12-PT-B  
**Article no.** 106043

## Program

|                                |  |  |                                |
|--------------------------------|--|--|--------------------------------|
|                                |  |  | Configurable temperature range |
| Supply voltage                 |  |  | 24 V DC                        |
| Inputs                         |  |  |                                |
| Digital                        |  |  | 6                              |
| of which can be used as analog |  |  | 2                              |
| Pt100                          |  |  | 2                              |
| Outputs                        |  |  |                                |
| Transistor                     |  |  | 4                              |
| Temperature range              |  |  |                                |
| Temperature detector           |  |  | -200...+200 °C<br>0...+850 °C  |

## Approbationen

|                      |                                                                                                            |
|----------------------|------------------------------------------------------------------------------------------------------------|
| UL approval          | Yes                                                                                                        |
| CSA approval         | Yes                                                                                                        |
| Product Standards    | IEC/EN see Technical Data; UL 508; CSA C22.2 No. 142-M1987; CSA C22.2 No. 213-M1987; CE marking<br>E135462 |
| UL File No.          | NRAQ                                                                                                       |
| UL CCN               | 012528                                                                                                     |
| CSA File No.         | 2252-01 + 2258-02                                                                                          |
| CSA Class No.        | UL listed, CSA certified                                                                                   |
| NA Certification     | IEC: IP20, UL/CSA Type: -                                                                                  |
| Degree of Protection |                                                                                                            |

## General

|                        |  |    |                                                      |
|------------------------|--|----|------------------------------------------------------|
| Standards              |  |    | EN 61000-6-1/-2/-3/-4, IEC 60068-2-6, IEC 60068-2-27 |
| Dimensions (W x H x D) |  | mm | 89 x 90 x 25 (installed)                             |
| Weight                 |  | kg | 0.14                                                 |
| Mounting               |  |    | Fitted into the power supply unit.                   |

## Terminal capacities

|                       |  |                 |                      |
|-----------------------|--|-----------------|----------------------|
| Solid                 |  | mm <sup>2</sup> | 0.24 (AWG 24 - 12)   |
| Flexible with ferrule |  | mm <sup>2</sup> | 0.22.5 (AWG 24 - 12) |
| Standard screwdriver  |  | mm              | 3.5 x 0.6            |

## Climatic environmental conditions

|                                                       |  |     |                                                                 |
|-------------------------------------------------------|--|-----|-----------------------------------------------------------------|
| Operating ambient temperature                         |  | °C  | -25 to 55, cold as per IEC 60068-2-1, heat as per IEC 60068-2-2 |
| Condensation                                          |  |     | Take appropriate measures to prevent condensation               |
| Storage                                               |  | °C  | - 40 - 70                                                       |
| Relative humidity, non-condensing (IEC/EN 60068-2-30) |  | %   | 5 - 95                                                          |
| Air pressure (operation)                              |  | hPa | 795 - 1080                                                      |

## Ambient conditions, mechanical

|                                                                            |             |         |                        |
|----------------------------------------------------------------------------|-------------|---------|------------------------|
| Pollution degree                                                           |             |         | 2                      |
| Protection type (IEC/EN 60529, EN50178, VBG 4)                             |             |         | IP20                   |
| Vibrations (IEC/EN 60068-2-6)                                              |             | Hz      |                        |
| Constant amplitude 0.15 mm                                                 |             | Hz      | 10 - 57                |
| Constant acceleration 2 g                                                  |             | Hz      | 57 - 150               |
| Mechanical shock resistance (IEC/EN 60068-2-27) semi-sinusoidal 15 g/11 ms |             | Impacts | 18                     |
| Drop to IEC/EN 60068-2-31                                                  | Drop height | mm      | 50                     |
| Free fall, packaged (IEC/EN 60068-2-32)                                    |             | m       | 1                      |
| Mounting position                                                          |             |         | Vertical or horizontal |

## Electromagnetic compatibility (EMC)

|                                                          |  |    |   |
|----------------------------------------------------------|--|----|---|
| Electrostatic discharge (IEC/EN 61000-4-2, Level 3, ESD) |  | kV |   |
| Air discharge                                            |  | kV | 8 |
| Contact discharge                                        |  | kV | 6 |

|                                                   |  |     |                                    |
|---------------------------------------------------|--|-----|------------------------------------|
| Electromagnetic fields (RFI), to IEC EN 61000-4-2 |  | V/m | 10                                 |
| Radio interference suppression                    |  |     | EN 55011 Class B, EN 55022 Class B |
| Burst Impulse (IEC/EN 61000-4-4, Level 3)         |  |     |                                    |
| Supply cables                                     |  | kV  | 2                                  |
| Signal lines                                      |  | kV  | 2                                  |
| Power pulses (surge) (IEC/EN 61000-4-5)           |  | kV  | 2 (supply cables, symmetrical)     |
| power pulses (surge) (IEC/EN 61000-4-5, level 2)  |  | kV  | 0.5 (supply cables, symmetrical)   |
| Radiated RFI (IEC/EN 61000-4-6)                   |  | V   | 10                                 |

## Insulation resistance

|                                         |  |  |                                      |
|-----------------------------------------|--|--|--------------------------------------|
| Clearance in air and creepage distances |  |  | EN 50178, UL 508, CSA C22.2, No. 142 |
| Insulation resistance                   |  |  | EN 50178                             |

## Digital inputs 24 V DC

|                                                 |                |         |                                                                                       |
|-------------------------------------------------|----------------|---------|---------------------------------------------------------------------------------------|
| Number                                          |                |         | 6                                                                                     |
| Inputs can be used as analog inputs             |                |         | 2 (I11, I12)                                                                          |
| Potential isolation                             |                |         |                                                                                       |
| From power supply                               |                |         | No                                                                                    |
| Between digital inputs                          |                |         | No                                                                                    |
| From the outputs                                |                |         | Yes                                                                                   |
| to PC interface, memory card, easyNet, easyLink |                |         | Yes                                                                                   |
| Rated operational voltage                       | U <sub>e</sub> | V<br>DC | 24                                                                                    |
| On 0 signal                                     | U <sub>e</sub> | V<br>DC | < 5.0 (I1 - I4) < 8.0 (I11, I12)                                                      |
| On 1 signal                                     | U <sub>e</sub> | V<br>DC | >15.0 (I1 - I4) > 8.0 (I11, I12)                                                      |
| Input current on 1 signal                       |                |         |                                                                                       |
| I11, I12                                        |                | mA      | 2.2 (at 24 V DC)                                                                      |
| Delay time from 0 to 1                          |                | ms      |                                                                                       |
| Debounce ON                                     |                | ms      | 20                                                                                    |
| Debounce OFF                                    |                | ms      | Normally 0.1 (I1 - I4), Normally 0.25 (I11 - I12)                                     |
| Delay time from 1 to 0                          |                | ms      |                                                                                       |
| Debounce ON                                     |                | ms      | 20                                                                                    |
| Debounce OFF                                    |                | ms      | Normally 0.1 (I1 - I4), normally 0.2 (I11, I12)                                       |
| Cable length (unscreened)                       |                | m       | 100                                                                                   |
| Frequency counter                               |                |         |                                                                                       |
| Quantity                                        |                |         | 4 (I1, I2, I3, I4)                                                                    |
| Counter frequency                               |                | kHz     | < 3                                                                                   |
| Pulse shape                                     |                |         | Square                                                                                |
| Incremental counter                             |                |         |                                                                                       |
| Quantity                                        |                |         | 2 (I1 + I2, I3 + I4)                                                                  |
| Counter frequency                               |                | kHz     |  3 |
| Pulse shape                                     |                |         | Square                                                                                |
| Signal offset                                   |                |         | 90°                                                                                   |
| Rapid counter inputs                            |                |         |                                                                                       |
| Number                                          |                |         | 4 (I1, I2, I3, I4)                                                                    |
| Counter frequency                               |                | kHz     | < 3                                                                                   |
| Pulse shape                                     |                |         | Square                                                                                |
| Cable length, screened                          |                | m       | < 20                                                                                  |

## Analog inputs

|                         |  |         |            |
|-------------------------|--|---------|------------|
| Potential isolation     |  |         |            |
| From power supply       |  |         | No         |
| From the digital inputs |  |         | No         |
| From the outputs        |  |         | Yes        |
| for Program code        |  |         | Yes        |
| Input type              |  |         | DC voltage |
| Signal range            |  | V<br>DC | 0 - 10     |

|                                 |  |     |                     |
|---------------------------------|--|-----|---------------------|
| Resolution, analog              |  | V   | 0.01                |
| Resolution, digital             |  | V   | 0.01                |
| Resolution                      |  | Bit | 10 (value 0 - 1023) |
| Input impedance                 |  | kΩ  | 11.2                |
| Accuracy of actual value        |  |     |                     |
| two MFD devices                 |  | %   | ± 3                 |
| Within a single device          |  | %   | ± 2                 |
| Conversion time, analog/digital |  | ms  | Each CPU cycle      |
| Input current                   |  | mA  | < 1                 |
| Cable length screened           |  | m   | < 30                |

### Analog inputs temperature resistance Pt100 or Ni1000 sensors

|                                                               |  |             |                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------------------------------|--|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Number                                                        |  |             | 2 x Pt 100 or 2 x Ni1000 (according to part no.)                                                                                                                                                                                                                                                                                                    |
| Input type resistance sensor                                  |  |             | Platinum sensor Pt100 according to DIN EN 60751, IEC 751: MFD-TP12-PT...<br>Nickel sensor Ni1000 according to DIN 43760: MFD-TP12-NI...                                                                                                                                                                                                             |
| Temperature range                                             |  | °C,<br>(°F) | Pt100, area A, selectable: -40 - +90, (-40 - 194); 0 - 250 (32 - 482); 0 - 400, (32 - 752)<br>Ni1000, area A, selectable: -40 - +90, (-40 - 194); 0 - 250 (32 - 482)<br>Pt100, area B: -0 - +8500, (32 - 1562); -200 - 200 (-328 - 392)                                                                                                             |
| Potential isolation                                           |  |             |                                                                                                                                                                                                                                                                                                                                                     |
| From power supply                                             |  |             | No                                                                                                                                                                                                                                                                                                                                                  |
| From the digital inputs                                       |  |             | No                                                                                                                                                                                                                                                                                                                                                  |
| From the outputs                                              |  |             | Yes                                                                                                                                                                                                                                                                                                                                                 |
| to PC interface, memory card, easyNet, easyLink               |  |             | Yes                                                                                                                                                                                                                                                                                                                                                 |
| Resolution digital, scaling per sensor                        |  |             | With operands "IA" and "MD", selectable under scaling: 12 (0- 4095) Bit<br>With operand "MD", selectable under scaling: 1, 0.1 °C (1, 0.1 °F)                                                                                                                                                                                                       |
| Measurement value resolution analog/digital                   |  | Bit         | Depending upon the scaling                                                                                                                                                                                                                                                                                                                          |
| Measuring current                                             |  | mA          | < 1.6                                                                                                                                                                                                                                                                                                                                               |
| Damage limit (in the case of a wiring error)                  |  |             | Apply external voltage                                                                                                                                                                                                                                                                                                                              |
| Measuring principle                                           |  |             | Two or three wire per sensor, selectable by connection of sensor                                                                                                                                                                                                                                                                                    |
| Accuracy (without electromagnetic compatibility interference) |  | %           | Two MFD devices between each other: Typically 1; max. 1.6 (Pt), 1.2 (Ni)<br>Pt100 sensor (offset error, linearity error, repetition accuracy, temperature error of device included): ± 0.8 of measuring range<br>Ni1000 sensor (offset error, linearity error, repetition accuracy, temperature error of device included): ± 0.8 of measuring range |
| Conversion time, analog/digital                               |  | ms          | without sampling time setting, selectable per sensor: 200<br>with sampling time (adjustable), selectable per sensor: 200 - 65535                                                                                                                                                                                                                    |
| additional measurement aids                                   |  |             | Filtering (software), smoothing of analog input signal (PT1 behavior), only with set sampling time, selectable per sensor: yes<br>Filter for the suppression of certain frequencies and their multiples: 50, 60, 250, 500 Hz                                                                                                                        |
| Diagnostics                                                   |  |             | Card diagnostic: yes<br>Wire break diagnostic per sensor: yes<br>Wire break diagnostic per sensor: yes<br>below lower measurement range: yes<br>Upper sensor measuring range exceeded: yes                                                                                                                                                          |
| Cable length screened                                         |  | m           | < 10                                                                                                                                                                                                                                                                                                                                                |

### Transistor outputs

|                                                        |                |         |                                                                                                                                                            |
|--------------------------------------------------------|----------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Number                                                 |                |         | 4                                                                                                                                                          |
| Rated operational voltage                              | U <sub>e</sub> | V<br>DC | 24                                                                                                                                                         |
| Admissible range                                       | U <sub>e</sub> | V<br>DC | 20.4 - 28.8                                                                                                                                                |
| Supply current                                         |                |         |                                                                                                                                                            |
| On 0 signal                                            | Normally/mi    | mA      | 18/32                                                                                                                                                      |
| On 1 signal                                            | Normally/mi    | mA      | 24 /44                                                                                                                                                     |
| Protection against polarity reversal                   |                |         | yes (Caution: A short circuit will result if 0 V or earth is applied to the outputs in the event that the supply voltage is connected to the wrong poles.) |
| Potential isolation                                    |                |         |                                                                                                                                                            |
| Potential isolation of the power supply, inputs        |                |         | Yes                                                                                                                                                        |
| From the inputs                                        |                |         | Yes                                                                                                                                                        |
| to PC interface, memory card, easyNet, easyLink        |                |         | Yes                                                                                                                                                        |
| Rated operational current at signal „1“ DC per channel | I <sub>e</sub> | A       | max. 0.5                                                                                                                                                   |

|                                                                                                                                         |      |            |                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------|------|------------|-------------------------------------------------------------------------------|
| Lamp load without $R_V$ per channel                                                                                                     |      | W          | 5 (Q1 - Q4)                                                                   |
| Residual current on 0 signal per channel                                                                                                |      | mA         | < 0.1                                                                         |
| Max. output voltage                                                                                                                     |      |            |                                                                               |
| On 0 signal with external load < 10 M $\Omega$                                                                                          |      | V          | 2.5                                                                           |
| On 1 signal with $I_e = 0.5$ A                                                                                                          |      | V          | $U = U_e - 1$ V                                                               |
| Short-circuit protection                                                                                                                |      |            | Thermal (Q1 - Q4), (evaluation with diagnostics input I16)                    |
| Short-circuit tripping current for $R_a \leq 10$ m $\Omega$                                                                             |      | A          | $0.7 \leq I_e \leq 2$ per output                                              |
| Total short-circuit current                                                                                                             |      | A          | 8                                                                             |
| Peak short-circuit current                                                                                                              |      | A          | 16                                                                            |
| Thermal cutout                                                                                                                          |      |            | Yes                                                                           |
| Max. operating frequency with constant resistive load $R_L < 100$ k $\Omega$<br>(depending on number of active channels and their load) |      | Ops./h     | 40000                                                                         |
| Parallel connection of outputs                                                                                                          |      |            |                                                                               |
| With resistive load, inductive load with external suppressor circuit, combination within a group                                        |      |            | Group 1: Q1 to Q4                                                             |
| Number of outputs                                                                                                                       | max. |            | 4                                                                             |
| Total max. current                                                                                                                      |      | A          | 2 (Caution! Outputs must be switched simultaneously and for the same period.) |
| Inductive load to EN 60947-5-1                                                                                                          |      |            |                                                                               |
| Without external suppressor circuit                                                                                                     |      |            |                                                                               |
| $T_{0.95} = 1$ ms, $R = 48$ $\Omega$ , $L = 16$ mH                                                                                      |      |            |                                                                               |
| Utilization factor                                                                                                                      |      | g          | 0.25                                                                          |
| Duty factor                                                                                                                             |      | %<br>DF    | 100                                                                           |
| Max. switching frequency $f = 0.5$ Hz (max. DF = 50 %)                                                                                  |      | Operations | $\leq 500$                                                                    |
| DC-13, $T_{0.95} = 72$ ms, $R = 48$ $\Omega$ , $L = 1.15$ H                                                                             |      |            |                                                                               |
| Utilization factor                                                                                                                      |      | g          | 0.25                                                                          |
| Duty factor                                                                                                                             |      | %<br>DF    | 100                                                                           |
| Max. switching frequency $f = 0.5$ Hz (max. DF = 50 %)                                                                                  |      | Operations | $\leq 500$                                                                    |
| $T_{0.95} = 15$ ms, $R = 48$ $\Omega$ , $L = 0.24$ H                                                                                    |      |            |                                                                               |
| Utilization factor                                                                                                                      |      | g          | 0.25                                                                          |
| Duty factor                                                                                                                             |      | %<br>DF    | 100                                                                           |
| Max. switching frequency $f = 0.5$ Hz (max. DF = 50 %)                                                                                  |      | Operations | $\leq 500$                                                                    |
| With external suppressor circuit                                                                                                        |      |            |                                                                               |
| Utilization factor                                                                                                                      |      | g          | 1                                                                             |
| Duty factor                                                                                                                             |      | %<br>DF    | 100                                                                           |
| Max. switching frequency, max. duty factor                                                                                              |      | Operations | Depending on the suppressor circuit                                           |

### Analog outputs

|                         |  |  |    |
|-------------------------|--|--|----|
| Potential isolation     |  |  |    |
| From power supply       |  |  | No |
| From the digital inputs |  |  | No |

### Point-to-point connection

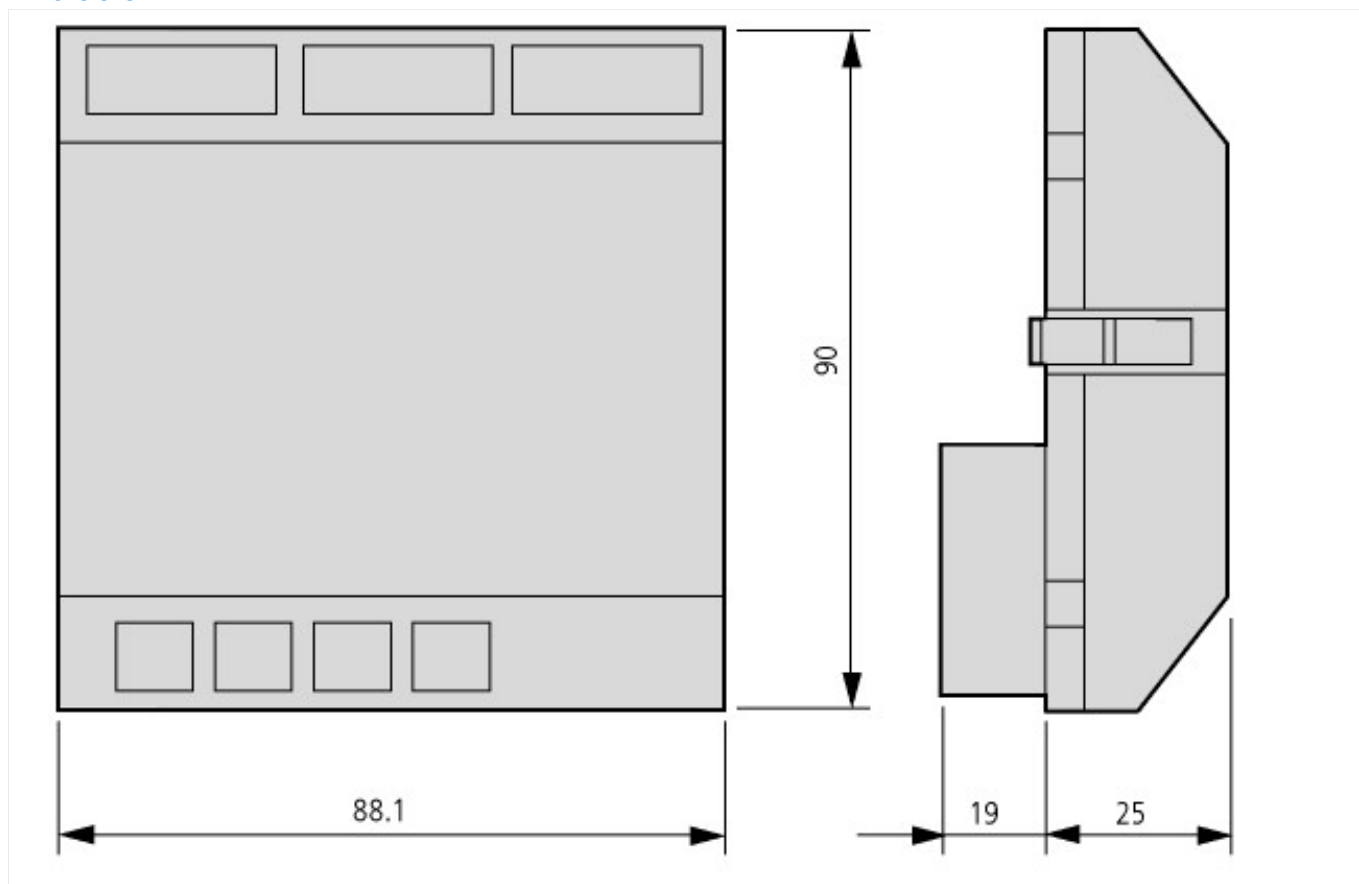
|                     |  |  |     |
|---------------------|--|--|-----|
| Potential isolation |  |  |     |
| From power supply   |  |  | Yes |

## Technical data according to ETIM 4.0

|                               |  |  |     |
|-------------------------------|--|--|-----|
| Output, voltage               |  |  | YES |
| Number of outputs             |  |  | 4   |
| Input, resistance thermometer |  |  | No  |
| Number of inputs              |  |  | 6   |
| Output, current               |  |  | No  |
| Input, voltage                |  |  | No  |
| Input, current                |  |  | No  |
| Output signal configurable    |  |  | YES |
| Input, resistance             |  |  | No  |

|                                  |  |     |     |
|----------------------------------|--|-----|-----|
| Resolution of the analog inputs  |  | bit | 12  |
| Resolution of the analog outputs |  | bit | 0   |
| Width                            |  | mm  | 90  |
| Depth                            |  | mm  | 89  |
| Height                           |  | mm  | 44  |
| Input signal configurable        |  |     | YES |
| Input, thermocouple              |  |     | YES |

## Dimensions



## Additional product information (links)

|                                                                 |                                                                                                                                                                       |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IL05013020Z (IL05013020Z) MFD-Titan Temperature module          | <a href="ftp://ftp.moeller.net/DOCUMENTATION/AWA_INSTRUCTIONS/IL05013020Z2010_11.pdf">ftp://ftp.moeller.net/DOCUMENTATION/AWA_INSTRUCTIONS/IL05013020Z2010_11.pdf</a> |
| AWB2528-1480 (MN05002001Z-EN) Multi-Function display - italiano | <a href="ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/h1480i.pdf">ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/h1480i.pdf</a>                                   |
| AWB2528-1480 (MN05002001Z-EN) Multi-Function display - English  | <a href="ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/h1480g.pdf">ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/h1480g.pdf</a>                                   |
| AWB2528-1480 (MN05002001Z-EN) Multi-Function display - français | <a href="ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/h1480f.pdf">ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/h1480f.pdf</a>                                   |
| AWB2528-1480 (MN05002001Z-EN) Multi-Function display - Deutsch  | <a href="ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/h1480d.pdf">ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/h1480d.pdf</a>                                   |
| <b>Engineering</b>                                              |                                                                                                                                                                       |
| Overview of functions                                           | <a href="ftp://ftp.moeller.net/DOCUMENTATION/PDF/GB/Funktionen_easy_MFD_G.pdf">ftp://ftp.moeller.net/DOCUMENTATION/PDF/GB/Funktionen_easy_MFD_G.pdf</a>               |
| Labeleditor                                                     | <a href="ftp://ftp.moeller.net/MFD/EASY-SOFT-PRO/labeleditor_206.exe">ftp://ftp.moeller.net/MFD/EASY-SOFT-PRO/labeleditor_206.exe</a>                                 |