ControlMaster CM15
Universal process indicator, 1/8 DIN

Measurement made easy

For more information
Further publications for the ControlMaster CM15 indicator are available for free download from:
www.abb.com/measurement
or by scanning this code:

Search for or click on:
- Data sheet: ControlMaster CM15
- User guide: ControlMaster CM15 and CMF160
- Communications supplement: ControlMaster CM10, CM15, CM30, CM50, CMF160 and CMF310
Basic level

- Process Alarms
  - Alarm Trip 1
  - Alarm Trip 2
  - Alarm Trip 3
  - Alarm Trip 4
  - Alarm Trip 5
  - Alarm Trip 6
  - Alarm Trip 7
  - Alarm Trip 8

Additional parameters may be enabled and displayed at Basic Setup level depending on the parameters selected at Advanced Level.

Advanced levels

- Initial Setup
  - App. Template
  - Instrument Tag
  - Mains Frequency
  - Config Action
  - Level 1 Indicator
  - Stats. Reset Source
  - Reset to Defaults
  - Custom

- Security Setup
  - Basic Password
  - Advanced Password
  - Reset Passwords

- Custom Config
  - Loop 1 PV
  - Volume 1
  - Loop 2 PV
  - Volume 2

- IrDA Configuration
  - Setup
  - Config.

Note. When in Advanced Level (configuration) mode, press and hold the key to return to the standard Operator page.

See rear cover
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1 Health & Safety

Document symbols
Symbols that appear in this document are explained below:

![WARNING]

The signal word ‘WARNING’ indicates an imminent danger. Failure to observe this information may result in death or severe injury.

![NOTICE]

The signal word ‘NOTICE’ indicates potential material damage.

Note.
‘Note’ indicates useful or important information about the product.

Safety precautions
Be sure to read, understand and follow the instructions contained within this manual before and during use of the equipment. Failure to do so could result in bodily harm or damage to the equipment.

![WARNING]

Installation and maintenance of this product must only be conducted by personnel authorized to work on electrical installations and in accordance with relevant local regulations.
1. Health & Safety

Potential safety hazards

Electrical

**WARNING**

To ensure safe use when operating this equipment, the following points must be observed:

- Up to 240 V AC may be present. Be sure to isolate the supply before removing the terminal cover.
- Normal safety precautions must be taken to avoid the possibility of an accident occurring when operating in conditions of high pressure and/or temperature.

Safety advice concerning the use of the equipment described in this manual or any relevant Material Safety Data Sheets (where applicable) can be obtained from the Company, together with servicing and spares information.

**Safety standards**

This product has been designed to satisfy the requirements of IEC61010-1:2010 3rd edition 'Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use' and complies with US NEC 500, NIST and OSHA.

**EC Directive 89/336/EEC**

Electrical – In order to meet the requirements of the EC Directive 89/336/EEC for EMC regulations, this product must be used in an industrial environment.

**End-of-life disposal**

The indicator contains a small lithium battery that must be removed and disposed of responsibly in accordance with local environmental regulations.

The remainder of the indicator does not contain any substance that causes undue harm to the environment and must be disposed of in accordance with the Directive on Waste Electrical and Electronic Equipment (WEEE). It must not be disposed of in Municipal Waste Collection.
Cleaning
The indicator can be hosed down if it has been installed to IP66/NEMA 4X standards. Warm water and a mild detergent can be used.

Symbols
Symbols that appear on this product are shown below:

Protective earth (ground) terminal.

Both direct and alternating current supply.

This symbol, when noted on a product, indicates a potential hazard that could cause serious personal injury and/or death. The user must refer to this commissioning instruction for operation and/or safety information.

This symbol, when noted on a product enclosure or barrier, indicates that a risk of electrical shock and/or electrocution exists. Only individuals qualified to work with hazardous voltages should open the enclosure or remove the barrier.

Recycle separately from general waste under the WEEE directive

Restriction of Hazardous Substances (RoHS)
The European Union RoHS Directive and subsequent regulations introduced in member states and other countries limits the use of six hazardous substances used in the manufacturing of electrical and electronic equipment. Currently, monitoring and control instruments do not fall within the scope of the RoHS Directive, however ABB has taken the decision to adopt the recommendations in the Directive as the target for all future product design and component purchasing.
2 Specification

Mechanical data

Protection
• Front face IP66/ NEMA 4X
• Rear panel IP20

Dimensions
• Height – 50 mm (2.0 in)
• Width – 97 mm (3.8 in)
• Depth behind panel – 120 mm (4.8 in)

Materials of construction
Glass filled polycarbonate

Weight
0.38 kg (0.84 lb)

Electrical

Power supply ranges
• 100 to 240 V AC ±10 % (90 V min. to 264 V max.)
  50/60 Hz
• 10 to 36 V DC (optional)

Power consumption
10 W max.

Inputs/Outputs

Analog inputs
• 1 universal
• 1 process

Analog outputs
• 1 standard
• 1 optional
• Galvanically isolated from the rest of the circuitry, 500V for up to 1 minute. Range programmable source and range 0 to 22 mA, maximum load 750 Ω @ 20 mA.

Relay outputs
• 1 standard
• 3 optional
• Fully programmable. Contacts rated at 5 A @ 240 V. Standard relays are changeover. Optional relays are selectable NO or NC by jumper.
Digital inputs/outputs
2 optional, user programmable as input or output.
Minimum input pulse duration: 125 ms
Input
• Volt free
• 24 V DC (1 signal 15 to 30 V, 0 signal -3 to 5 V)
Output
• Open collector output
• 30 V, 100 mA max. switched
• Conforms to IEC 61131-2
Update Rate
125 ms

Environmental data
Ambient operating temperature
0 to 55 °C (32 to 131 °F)
Ambient operating humidity
5 to 95 % RH non-condensing
Storage temperature
–20 to 70 °C (–4 to 158 °F)

Approvals, certification & general safety
• EN-61010-1
• cULus
• Overvoltage class III on mains, Class II on inputs and outputs
• Pollution category 2
• Insulation category 2
Emissions and Immunity
Meets the requirements of IEC 61326 for an industrial environment
3 Installation

- Locate the indicator in a position where its operating temperature and humidity limits will not be exceeded and ensure that it is suitably protected from direct sunlight, rain, snow and hail.
- Select a location away from strong electrical and magnetic fields. If this is not possible (particularly in applications where mobile communications equipment is used), use screened cables within flexible, earthed metal conduit.

Siting

At eye level

Close to the sensor

Avoid vibration

Figure 1  Siting

Temperature limits

Humidity limits

Use screened cable

0 °C (32 °F) min.

55 °C (131 °F) max.

0 to 95 % RH

IP66/NEMA4X (front panel), IP20 (rear)

Figure 2  Environmental requirements
Mounting

ControlMaster CM15 is designed for panel mounting. For NEMA4X protection, a panel thickness of 2.5 mm (0.1 in) is required.

Referring to Figure 3:

1. Cut a hole of the correct size for the indicator in the panel.
2. Insert the indicator into the panel cut-out.
...3 Installation

Referring to Figure 4:

1. Position one panel clamp A at the side of the case against the panel.
2. Locate the panel clamp anchor B in slot C.
3. Tighten the panel clamp anchor screw D until panel clamp A is lightly touching the panel.
4. Repeat steps 1 to 3 to fit the remaining panel clamp E and panel clamp anchor F.
5. Torque tighten both panel clamp anchor screws to 0.1 N·m (0.9 lbf·in).

NOTICE

Do not over-tighten the screws.
4 Electrical connections

**WARNING**

- The indicator is not fitted with a switch therefore a disconnecting device such as a switch or circuit breaker conforming to local safety standards must be fitted to the final installation. It must be fitted in close proximity to the indicator within easy reach of the operator and must be marked clearly as the disconnection device for the indicator. A fuse must be fitted in accordance with Figure 6 on page 14.
- Remove all power from the supply, relay and any powered control circuits and high common mode voltages before accessing or making any connections.
- Use cable appropriate for the current loads: 3-core cable rated 3 A and 90 °C (194 °F) minimum, that conforms to either IEC 60227 or IEC 60245. The terminals accept cables from 0.8 to 2.5 mm² (18 to 14 AWG).
- The indicator conforms to installation category II of IEC 61010.
- All connections to secondary circuits must have basic insulation.
- After installation there must be no access to live parts, for example, terminals.
- Terminals for external circuits are for use only with equipment with no accessible live parts.
- If the indicator is used in a manner not specified by the company, the protection provided by the equipment may be impaired.
- All equipment connected to the indicator’s terminals must comply with local safety standards (IEC 60950, EN601010-1).
...4 Electrical connections

**NOTICE**

- Always route signal leads and power cables separately, preferably in earthed (grounded) metal conduit.
- Use screened cable for signal inputs and relay connections.
- Replacement of the internal battery (type Varta CR1620 3V lithium cell) must be carried out by an approved technician only.

**Accessing the connection terminals**

Referring to Figure 5, press terminal cover release catch A and pull the terminal cover B away from the indicator body.

Figure 5  Removing terminal cover
Rear view

**Comms**

- **Tx**
- **PSU**

**Standard connections**

- **1** +
- **2** -
- **3** +
- **4** -
- **5** -
- **6** +
- **7** -
- **8** NC
- **9** C
- **10** NO
- **11** Line***
- **12** Neutral

- **10 to 240 V AC**
- **10 W**
- **+ 10 to 36 V DC**

**Option board 1**

- **Analog output 2**
- **Digital output + external**
- **Digital input/output 1**
- **Digital input/output 2**
- **Digital input/output –**
- **Relay output 2**
- **Relay output 3**
- **Relay output 4**

**Option board 1A**

- **Relay output 2**

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- *Refer to the Communications Supplement ([IM/CM/C-EN](#)) for MODBUS connection details.

- **N/O or N/C contact selection is made via internal jumper links.**
  N/O is the factory default setting.

- **200 mA type T fuse (mains AC) or 2 A type T fuse (120 V DC max.) and external isolating switch. For UL-marked indicators the fuse must be UL recognized.**

- **Provides 24 V digital output (observe + and – connections).**

Figure 6 Electrical connections
...4 Electrical connections

Standard analog inputs (1 and 2)

* Using internal transmitter power supply.

** Fit the CJ sensor supplied if analog input 1 or 2 are THC inputs.
Alternatively, it is possible to use an external fixed cold (reference) junction if the controller is programmed for use with millivolt inputs and the appropriate thermocouple linearizer is selected.

*** Analog input 2 can be used with THC inputs only if analog input 1 is also used as a THC input.

**** For mA input types, to ensure loop continuity when the indicator is switched off, fit a 2V7 Zener diode as shown.

Note. 3-lead RTD leads must have equal resistance, not exceeding 20 Ω each.
5 Front panel keys

Operation is performed using the keys on the front panel. These enable local navigation and selection of software options on all displays, acknowledgment of alarms and error messages, monitoring and access to all menus.

All diagnostics messages are displayed within the Diagnostics View.

Prompts associated with active keys are displayed on each screen. Diagnostic and display icon descriptions are included in this document.

Key functions for the indicator overlay are described below:

- Navigation key (upper)/programmable soft key.
- Up/Down keys – navigate up/down menu items and increase/decrease displayed values.
- Navigation key (lower)/operator level access key.

**Note.** When a soft key option is assigned to key A, the Advanced Level (see page 18) must be accessed using key C.
6 Operator level menus

Operator level menus are used to start, stop and reset totalizers, reset statistics, select the view and to enter Basic and Advanced modes (via the Access Level).

To access Operator Level menus:
1. From the Operator Page, press \[ \] to view the available menus.
2. Use the \[ \] and \[ \] keys to scroll through the menus and menu options.
3. Press \[ \] to expand menu levels and to select menu options or press \[ \] to return to the previous menu.

<table>
<thead>
<tr>
<th>Reset Statistics</th>
<th>Resets current statistics.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Totalizer</td>
<td>Start, stop and reset totalizers.</td>
</tr>
<tr>
<td>View Select</td>
<td>Switches the view to an Operator Page or the Diagnostic View.</td>
</tr>
<tr>
<td>Enter Config. Mode</td>
<td>Displays the Access Level selection views.</td>
</tr>
</tbody>
</table>
7 Access levels and security options

The access level menus are used to enter the Basic and Advanced menus, view all parameters in read only mode and to logout (return to operator view mode).

To view Access Level menus:

1. From the operator view mode, press or press to display the available operator menus and use the and keys to scroll to Enter Config. Mode, then press . The Access Level menu is displayed.

2. Use the and keys to scroll to the required/permitted level of access (basic or advanced), then press .

<table>
<thead>
<tr>
<th>Access Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logout</td>
<td>Displayed after basic or advanced level are accessed. Logs the user out of basic or advanced level. If passwords are set, a password must be entered to access the levels again after selecting log out.</td>
</tr>
<tr>
<td>Read Only</td>
<td>Enables all parameter settings to be viewed.</td>
</tr>
<tr>
<td>Basic</td>
<td>Enables access to the basic level and adjustment of totalizer count settings and alarm trip points.</td>
</tr>
<tr>
<td>Advanced</td>
<td>Enables configuration access to all parameters.</td>
</tr>
<tr>
<td>Service</td>
<td>Reserved for use by authorized personnel.</td>
</tr>
</tbody>
</table>
Access levels and security options

Security options

Passwords can be set to enable secure end-user access at 2 levels: **Basic** and **Advanced**. The **Service** level is password protected and reserved for factory use only.

Passwords are set, changed or restored to their default settings at the device setup/security setup parameter.
8 Diagnostics messages

The indicator is programmed to display diagnostics messages that provide information on servicing requirements and any other conditions that develop during operation.

When a diagnostics condition is detected, the associated NAMUR Icon, together with the highest priority diagnostics message are displayed in the status bar when in operator view. A list of all currently active diagnostic alarm states are displayed in the diagnostic view.
## Diagnostics messages

<table>
<thead>
<tr>
<th>Icon</th>
<th>Number/Message</th>
<th>Possible cause</th>
<th>Suggested action</th>
</tr>
</thead>
<tbody>
<tr>
<td>✗</td>
<td>F250.00</td>
<td>PV 1 Failed&lt;br&gt;Problem with input assigned to loop 1 (2) PV. Broken sensor leads, defective input source or input signal out of permitted range.</td>
<td>Check wiring. Check input source. Check if input signal is outside permitted limits.</td>
</tr>
<tr>
<td>✗</td>
<td>F248.001</td>
<td>PV 2 Failed&lt;br&gt;Problem with Input assigned to loop 1 (2) PV. Broken sensor leads, defective input source or input signal out of permitted range.</td>
<td>Check wiring. Check input source. Check if input signal is outside permitted limits.</td>
</tr>
<tr>
<td>✗</td>
<td>F222.014</td>
<td>CJ 1 Failed&lt;br&gt;Error in cold junction measurement associated with AIN1 (AIN3). Wiring fault or defective sensor.</td>
<td>Check cold junction device is correctly fitted. Ensure I/P 2 is turned off. Replace CJ sensor.</td>
</tr>
<tr>
<td>✗</td>
<td>F220.015</td>
<td>CJ 2 Failed&lt;br&gt;Error in cold junction measurement associated with AIN1 (AIN3). Wiring fault or defective sensor.</td>
<td>Check cold junction device is correctly fitted. Replace CJ sensor.</td>
</tr>
<tr>
<td>☓</td>
<td>F216.016</td>
<td>NV Error&lt;br&gt;Proc Bd&lt;br&gt;Failure of non-volatile memory on processor display board or permanent corruption of its data.</td>
<td>Check all configuration parameters and correct any errors. Acknowledge error. If problem persists contact local service organization.</td>
</tr>
<tr>
<td>☓</td>
<td>F214.017</td>
<td>NV Error&lt;br&gt;Main Bd&lt;br&gt;Failure of non-volatile memory on main board or permanent corruption of its data.</td>
<td>Check calibration of AO1 and AO2. Recalibrate if necessary. Acknowledge error. If problem persists contact local service organization.</td>
</tr>
<tr>
<td>☓</td>
<td>F212.018</td>
<td>NV Error&lt;br&gt;Opt Bd 1&lt;br&gt;Failure of non-volatile memory on option board 1 or permanent corruption of its data.</td>
<td>Check calibration of AIN1 and AIN2. Recalibrate if necessary. Acknowledge error. If problem persists contact local service organization.</td>
</tr>
<tr>
<td>Icon</td>
<td>Number/Message</td>
<td>Possible cause</td>
<td>Suggested action</td>
</tr>
<tr>
<td>------</td>
<td>----------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>✗</td>
<td>F210.019 NV Error Opt Bd 2</td>
<td>Failure of non-volatile memory on option board 2 or permanent corruption of its data.</td>
<td>Check calibration of AIN3 and AIN4. Recalibrate if necessary. Acknowledge error. If problem persists, contact local service organization.</td>
</tr>
<tr>
<td>✗</td>
<td>F208.020 NV Error Comm Bd</td>
<td>Failure of non-volatile memory on communications board or permanent corruption of its data.</td>
<td>Acknowledge error. Check communications board is correctly identified by device. If problem persists, contact local service organization.</td>
</tr>
<tr>
<td>✗</td>
<td>F206.021 NV Error SW Key 1</td>
<td>Failure of non-volatile memory on Software key 1 or permanent corruption of its data.</td>
<td>Acknowledge error. Check software key functionality is enabled. If problem persists, contact local service organization.</td>
</tr>
<tr>
<td>✗</td>
<td>F204.022 NV Error SW Key 2</td>
<td>Failure of non-volatile memory on Software key 1 or permanent corruption of its data.</td>
<td>Acknowledge error. Check software key functionality is enabled. If problem persists, contact local service organization.</td>
</tr>
</tbody>
</table>
**Advanced levels**

**Menu**

- **Totalizer**
  - Totalizer 1 (2)
  - Mode
  - Source
  - Count Direction
  - Units
  - Count Rate
  - Cutoff
  - Stop Go Source
  - Total DPs
  - Preset Count
  - Predet Count
  - Intermediate Count
  - Wrap Enable
  - Reset Source
  - Reset Days
  - Reset Hour

- **Functions**
  - Logic Equations
    - Equation Number
    - Operand 1 (8)
    - Invert 1 (8)
    - Operator 1 (7)
  - Math Blocks
    - Math Block Number
    - Block Type
    - Eng. DPs
    - Eng. Low
    - Eng. High
    - Eng. Units
    - Fault Action
    - Source 1 (2)
    - Source 1 (2) Constant
    - Reset Source
    - Average Duration
  - Linearizer 1 (2)
    - Source
    - Lin 1 (2) Breakpoints
  - Delay Timer 1 (2)
    - Source 1 (2)
    - Delay Time
    - On Time
    - Real Time Alarms
  - Real Time Alarm 1 (2)
    - Bank Control
    - Bank Size
    - Control Source
    - Bank 1 (6)

- **Communication**
  - Refer to the Communications Supplement (IM/CM/C-EN)
  - Diagnostic History
  - Source Analysis
    - Analog Source
    - Digital Source
    - Invalid Sources

- **Diagnostics**
  - Instrument Type
  - I/O Build
  - No. Analog Inputs
  - No. Analog Outputs
  - No. Relays
  - No. Digital I/O
  - Functionality
  - Serial No.
  - Hardware Revision
  - Software Revision

- **Device Info**