

Specification DataFile

- **High visibility LED display**
 - the clearest view of your process status

- **0.1% input measurement accuracy**
 - precise indication of process measurement

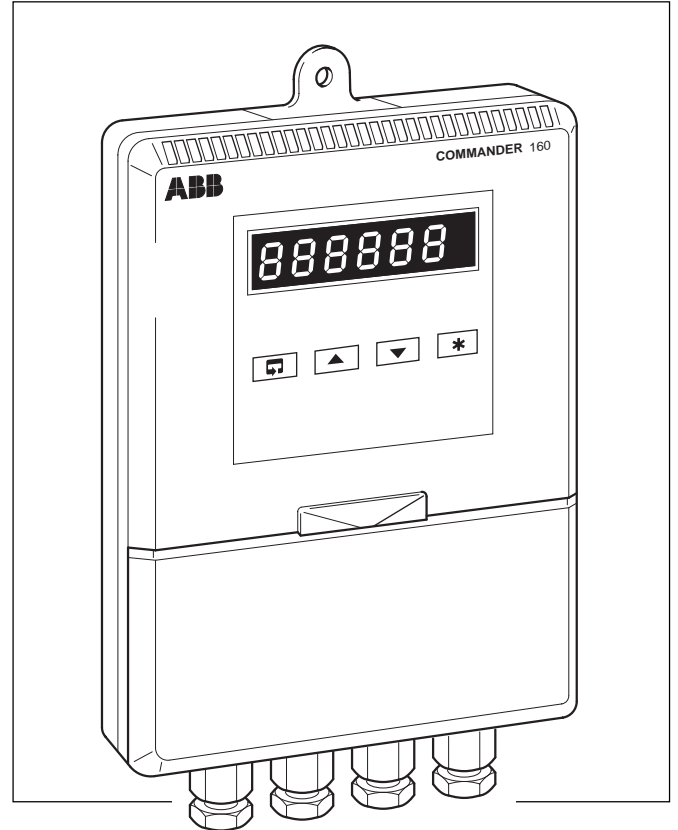
- **IP66/NEMA4X wall-/pipe-mounted weatherproof enclosure**
 - reliability in the harshest environments

- **Analog and relay outputs as standard**
 - alarm and retransmission facilities built-in

- **Totalizer and math functions**
 - 6-digit totals and max./min. values

- **Universal process input with transmitter power supply**
 - direct connection for any process signal

- **RS485/MODBUS serial communications**
 - SCADA, PLC and open system integration



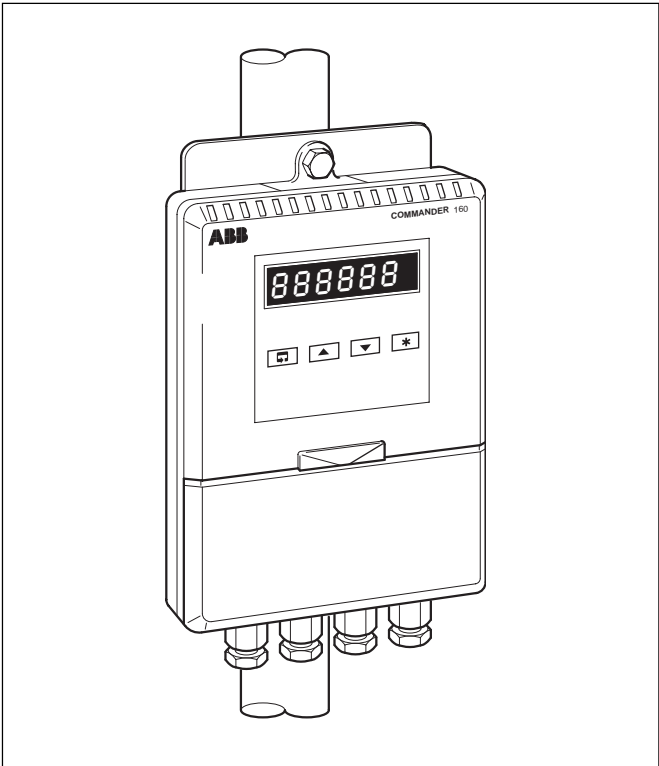
*COMMANDER 160
reliable process indicator –
wherever it's needed*

COMMANDER 160

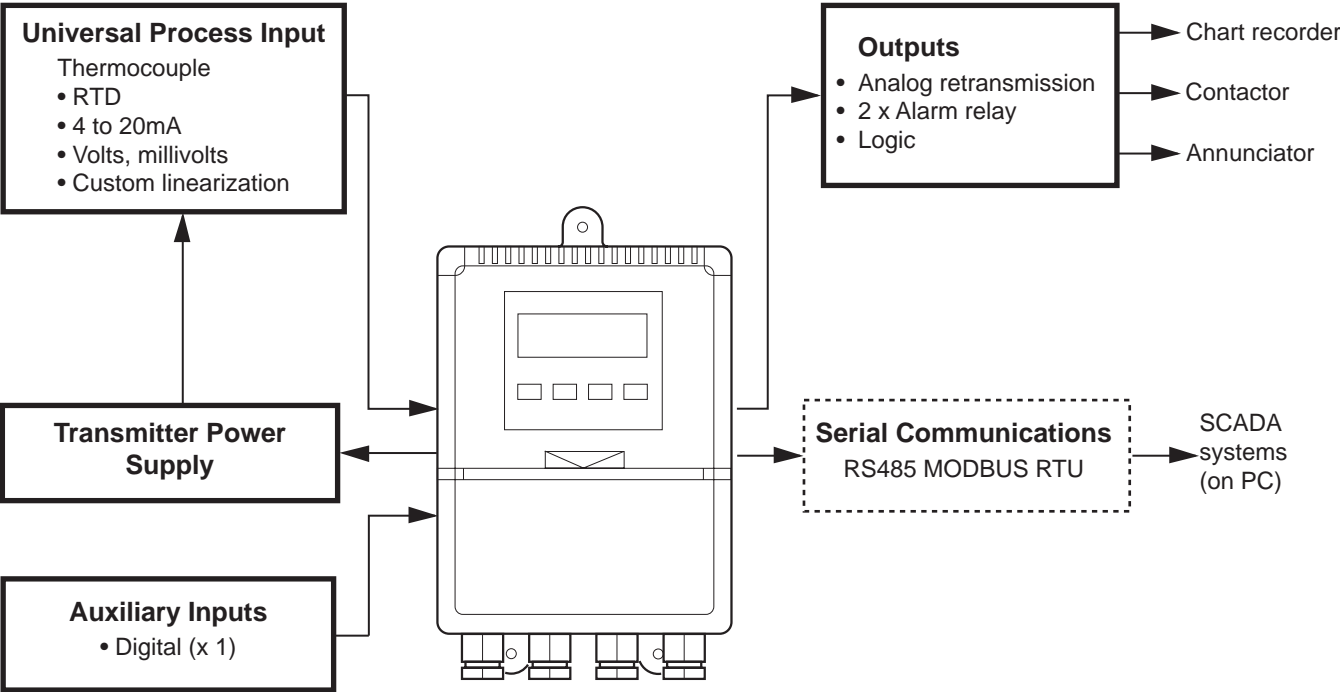
The COMMANDER 160 Universal Wall-mounting Indicator is a highly versatile, **5-digit industrial display indicator**, with the capability to measure and indicate temperature, pressure, flow, level and other process variables.

The standard COMMANDER 160 provides a **retransmission output** and **two alarm relays**, with the option to add **RS485 communications** to suit your application.

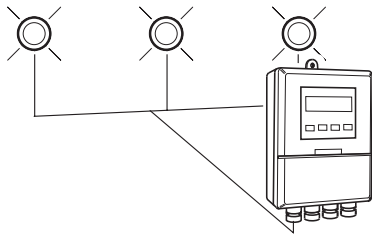
With all-round **IP66/NEMA4X protection** as standard, and superior RF immunity, the COMMANDER 160 has been designed to provide reliable indication in the harshest environments.



Pipe-mounted COMMANDER 160 Indicator

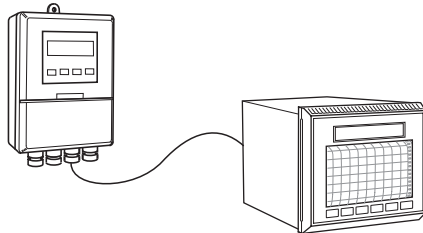


KEY: Standard Option



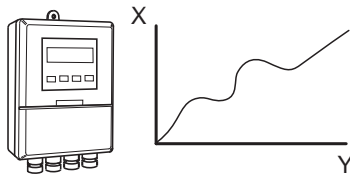
Display and Alarm

The COMMANDER 160's two built-in 5A relays can be used to annunciate high or low process alarms. Active alarms are indicated by flashing LEDs to the right of the main display.



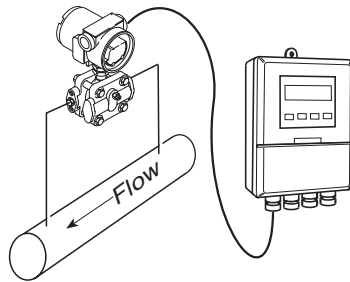
Isolated Retransmission

The COMMANDER 160 has, as standard, a 4 to 20mA output for retransmission of the process variable to a chart recorder or data logger.



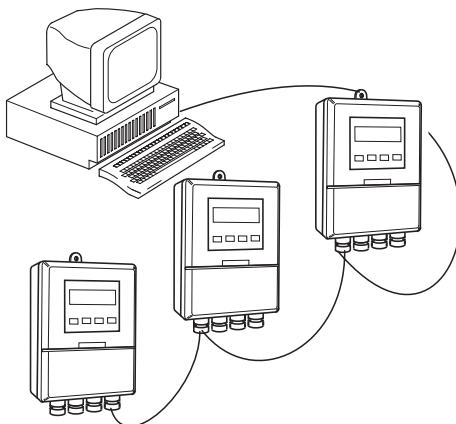
Custom Linearization

As standard the COMMANDER 160 has a 20-breakpoint linearizer suitable for volume calculation. (Factory setup using PC configurator).



Flow Totalization, 6 Digits

A standard feature in the COMMANDER 160 is flow totalization. This totals any 4 to 20mA flow signal. With the built-in transmitter power supply and root extraction this makes the COMMANDER 160 ideal for use with Differential Pressure devices such as the WEDGEMASTER. It can also be configured for simple batch control by use of preset and predetermined totals.



RS485/MODBUS

Fitted with an optional RS485 serial communication board the COMMANDER 160 can communicate with PLCs and SCADA systems using the MODBUS protocol.

COMMANDER 160

Specification

Summary

Fully user-configurable universal indicator

IP66/NEMA4X all-round protection

Large 5-digit display

Totalizer/math functions as standard

Operation

Display

High-intensity 7-segment, 1 x 6-digit LED display

Three alarm LED indicators

| | | |
|---------------|---------------|-----------------|
| Display range | process value | –9999 to +99999 |
| | totalization | 0 to 999999 |

Display resolution ± 1 digit

Display height 14mm (0.56 in.)

Configuration

User-defined via front panel or configurator

Standard Functions

Totalizer

Six-digit, batch and secure totals

Alarms

| | |
|--------|--|
| Number | Three user-defined |
| Types | High/low process High/low latch Fast/slow rate |

Maths function

Maximum and minimum value detection
Average value calculation

Analog Input

Input sampling rate

250ms

Type

Universally configurable to provide:

- Thermocouple (THC)
- Resistance Thermometer (RTD)
- Millivolt
- Current
- D.C. Voltage

Input impedance

| | |
|-------|---------------|
| mA | 100 Ω |
| mV, V | >10M Ω |

Linearizer functions

Programmable for:

- SqRoot, THC types B, E, J, K, N, R, S, T or Pt100
- Custom 20-breakpoint linearizer, set up by PC configurator

Broken sensor protection

Upscale drive on thermocouple and RTD
Downscale drive on milliamps and voltage

Cold junction compensation

Automatic CJC incorporated as standard
Stability < 0.05°C/°C change in ambient temperature

Input protection

| | |
|-----------------------|---|
| Common mode isolation | > 120dB at 50/60Hz with 300 Ω imbalance resistance |
| Series mode rejection | > 60db at 50/60Hz |

Transmitter power supply

24V, 30mA max. to power one 2-wire transmitter

Outputs/Inputs

Retransmission

Analog, configurable in the range of 4 to 20mA
Max. load 15V (750 Ω at 20mA)
Accuracy $\leq 0.25\%$ of span
Isolation 500V d.c. from input (not isolated from logic output)
Assignable to Process Variable or Average PV

Logic output

| | |
|-----------|---|
| Rating | 18V d.c. at 20mA |
| Min. load | 400 Ω |
| Isolation | 500V from input (not isolated from retransmission output) |

Relay output

| | |
|----------|--|
| Number | 2 standard |
| Rating | (SPDT) 5A at 115/230V a.c. |
| Function | Alarms, totalizer count pulse, totalizer wrap pulse or end of batch alarm. |

Digital input

| | |
|---------------|-----------|
| Type | Volt-free |
| Minimum pulse | 250ms |

Options

MODBUS serial communications

| | |
|-------------|--------------------------|
| Connections | RS422/RS485, 2 or 4-wire |
| Speed | 2.4k or 9.6k baud rate |
| Protocol | MODBUS RTU slave |

Physical

Size

160mm (6.3 in.) wide x 250mm (9.84 in.) high x 68mm (2.68 in.)

Weight

2kg (4.5 lb) approx.

Mounting Option

Wall-mounted
Pipe-mounted with optional kit Pt. No. 4600/0138

Standard Analog Input Ranges

| Thermocouple (THC) | Maximum Range °C | Maximum Range °F | Accuracy (% of reading) * |
|--------------------|------------------|------------------|-----------------------------------|
| B | –18 to 1800 | 0 to 3270 | 0.1% or $\pm 2^{\circ}\text{C}$ |
| E | –100 to 900 | –140 to 1650 | 0.1% or $\pm 0.5^{\circ}\text{C}$ |
| J | –100 to 900 | –140 to 1650 | 0.1% or $\pm 0.5^{\circ}\text{C}$ |
| K | –100 to 1300 | –140 to 2350 | 0.1% or $\pm 0.5^{\circ}\text{C}$ |
| N | –200 to 1300 | –325 to 2350 | 0.1% or $\pm 0.5^{\circ}\text{C}$ |
| R | –18 to 1700 | 0 to 3000 | 0.1% or $\pm 1.0^{\circ}\text{C}$ |
| S | –18 to 1700 | 0 to 3000 | 0.1% or $\pm 1.0^{\circ}\text{C}$ |
| T | –250 to 300 | –400 to 550 | 0.1% or $\pm 0.5^{\circ}\text{C}$ |

* Performance accuracy is not guaranteed at extreme low end of thermocouple ranges.

Min. span below zero Type T $70^{\circ}\text{C}/126^{\circ}\text{F}$ Type N $105^{\circ}\text{C}/189^{\circ}\text{F}$

THC standards DIN 43710 IEC 584

| Resistance Thermometer (RTD) | Maximum Range °C | Maximum Range °F | Accuracy (% of reading) ** |
|------------------------------|------------------|------------------|-----------------------------------|
| PT100 | –200 to 600 | –325 to 1100 | 0.1% or $\pm 0.5^{\circ}\text{C}$ |

** RTD, 3-wire platinum, 100 Ω per DIN 43760 standard (IEC751), with range of 0 to 400 Ω .

| Linear Inputs | Range | Accuracy (% of reading) |
|---------------|---------|------------------------------|
| Milliamps | 0 to 20 | 0.2% or $\pm 2\mu\text{A}$ |
| Milliamps | 4 to 20 | 0.2% or $\pm 2\mu\text{A}$ |
| Volts | 0 to 5 | 0.1% or $\pm 200\mu\text{V}$ |
| Volts | 1 to 5 | 0.1% or $\pm 200\mu\text{V}$ |
| Millivolts | 0 to 50 | 0.1% or $\pm 20\mu\text{V}$ |

| Square Root Input | Range | Accuracy (% of reading) *** |
|-------------------|---------|-----------------------------|
| Milliamps | 4 to 20 | 0.2% or $\pm 2\mu\text{A}$ |

*** Below input of 4.64mA the input is linear

Electrical

Voltage

85 to 265V a.c. 50/60Hz

24V d.c. (option)

Power consumption

< 6VA a.c.

< 5W d.c.

Power interruption protection

< 60ms/< 3 cycles, no effect

> 60ms/>3 cycles, instrument returns to operation after a controlled reset

EMC

Emissions

Meets requirements of EN50081-2

Immunity

Meets requirements of EN50082-2

Design and manufacturing standards

CE mark

Electrical safety

EN61010 – 1

Environmental

Operating limits

–10 to 55°C (32 to 131°F)

5 to 95% RH non-condensing

Temperature stability

< 0.02% of reading or $2\mu\text{V}/^{\circ}\text{C}$ ($1\mu\text{V}/^{\circ}\text{F}$)

Enclosure

IP66/NEMA4X

Dimensions in mm (in.)
Weight 2kg (4.5lb)

The drawing consists of three views of the meter: front, side, and rear. The front view shows a rectangular meter with a display screen and three indicator lights. The side view shows the profile of the meter with mounting tabs. The rear view shows the back of the meter with mounting holes and a cable entry point. Dimensions are provided in millimeters and inches for each view.

Front View Dimensions:

- Width: 160 (6.3)
- Height: 250 (9.84)
- Bottom Mounting Hole Spacing: 69 (2.72)
- Bottom Mounting Hole Diameter: 6.5 (0.25) Dia.
- Bottom Mounting Hole Centers: 200 (7.9)
- Allowance for Cable Bends: 200 (7.9)

Side View Dimensions:

- Width: 68 (2.68)
- Height: 214 (8.43)
- Mounting Tab Height: 232 (9.13)
- Mounting Tab Width: 42 (1.65)

Rear View Dimensions:

- Width: 68 (2.68)
- Height: 214 (8.43)
- Mounting Tab Height: 232 (9.13)
- Mounting Tab Width: 42 (1.65)
- Mounting Tab O.D.: 61 (2.375) O.D.
- Mounting Tab Material: Vertical or Horizontal Post (Kit Part No. 4600/0138)

The diagram shows a 24V d.c. supply terminal block with 15 terminals. The connections are as follows:

- Terminals 1 & 2:** L and N (85 to 265V a.c. Mains Supply).
- Terminals 3 & 4:** TxPSU (-) and (+).
- Terminals 5, 6, 7:** Relay 1 (N/O, C, N/C).
- Terminals 8, 9, 10, 11, 12, 13:** Relay 2 (N/O, C, N/C) and Relay 3 (N/O, C, N/C).
- Terminals 14 & 15:** RTD (-) and (+).
- Terminals 16, 17, 18:** Analog/logic output (+ve).
- Terminals 19, 20, 21, 22, 23, 24:** RS485 (TX+, TX-, RX+, RX-, C) and Digital input (-, +).

A note indicates: * Fit 100Ω resistor supplied.

Ordering Guide

| COMMANDER 160 Universal Wall-mounted Indicator | | C160 | / | X | X | X | X / | XXXX |
|--|---|------|---|---|---|---|-----|--------------------|
| Standard Option | Two relays + one digital input + 4 to 20mA retransmission + logic output | 0 | 1 | | | | | |
| MODBUS Option | Two relays + one digital input + 4 to 20mA retransmission + logic output + RS485 MODBUS | 0 | 3 | | | | | |
| Power Supply | 85V to 265V a.c. (M20 cable glands) | | | | | 0 | | |
| | 24V d.c. (M20 cable glands) | | | | | 1 | | |
| | 85V to 265V a.c. (NPT cable glands) | | | | | 2 | | |
| | 24V d.c. (NPT cable glands) | | | | | 3 | | |
| Build | Standard | | | | | | 0 | |
| Programming/Special Features | Configured to factory standard Configured to customer detail Agreed special features | | | | | | | STD CUS SPXX |

Coding Example

| | C160 | / | 01 | 0 | 0/ | STD |
|--|------|---|----|---|----|-----|
| COMMANDER 160 Universal Wall-mounted Indicator | | | | | | |
| Standard option | | | | | | |
| 85V to 265V a.c. power supply (M20 cable glands) | | | | | | |
| Standard build | | | | | | |
| Configured to factory standard | | | | | | |



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