

DU-35CL

4-20mA Process Loop
3 1/2 Digit with 0.56" LEDs
in a 1/8 DIN Case



Easily user scaled, this meter is ideal for 4-20mA process loop measurement and indication in any engineering unit of measure.

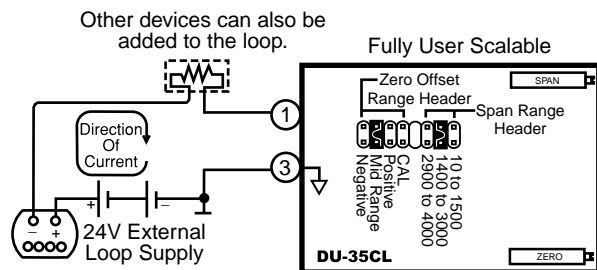
General Features

The DU-35CL is an economical 4-20mA process loop measuring meter. It is easily user adjustable to any reading between -1999 and +1999 without component changes. The unique set of Signal Conditioning Components incorporated in this meter, enables the use of a simple two step scaling and calibration procedure, which eliminates the back and forth interaction between zero and span settings, which is often required to calibrate less finely engineered products.

An economical option is the dummy (non-functional) right-hand-side zero which allows the DU-35CL to display of readings from -19990 to +19990 without going to the expense of a 4.5 digit meter. The apparent resolution with the dummy zero option would be 10 counts.

Typical Application Connections

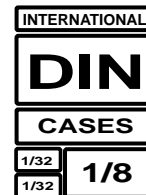
4 to 20mA Process Loop Measurement



Order the DU-35CLE, if you require the loop excitation voltage to be supplied by the meter.

Compatibility

The DU-Series have a matching DIN case style that is complementary to the Lynx, Leopard and Tiger family of meters. DU-Meters are the OEM's choice for economical switchboard and process indication. For economy, each model is dedicated to a specific application and designed for quick and easy installation.



Specifications

Input Configuration:Series connection to 4-20mA process loop.

Full Scale Ranges:User adjustable to any scaling between -1999 to +1999.

Input Impedance:70Ω. Maximum 1.4V drop

A/D Converter:12 Bit Dual Slope

Accuracy:± (0.05% of reading + 3 digits)

Temperature Coefficient: 100ppm/°C (Typical)

Warm Up Time:One minute to specified accuracy

Conversion Rate:3 readings per second

Display:0.56" hi efficiency Red or optional Green LEDs. Display Hold and Display Test are provided.

Polarity:Bipolar. Assumed positive displays negative.

Decimal Selection:Header under face plate, X•X•X•X•

Over-range Indication: ...Most significant "1" digit and polarity signal are displayed with all other digits blank.

Power Supply (std):120/240V AC, 50/60 Hz. approx 2.5W.
(Optn) VO-DC/ISOIsolated Switcher 9 to 36V DC/12 to 24V AC
(Optn) VO-24VIsolated Transformer 24V AC ±10%
(Optn) VO-5V DCNon-isolated 5V DC ±10%

Operating Temperature: ...-10 to 50 °C

Storage Temperature:-20 to 70 °C

Relative Humidity:95% (non-condensing)

Case Dimensions:1/8 DIN, Bezel: 96x48mm (3.78"x1.89")
Depth behind bezel 117 mm (4.61") plus 11.8mm (0.47") for Right-angled Connector or 20mm (0.79") for Straight-through Connectors.

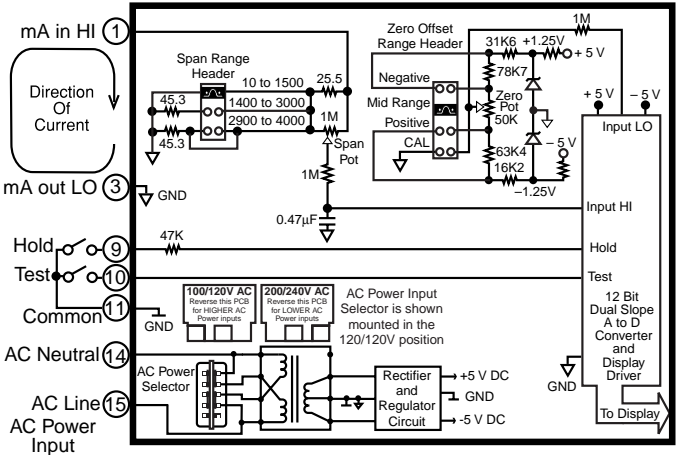
Weight:11 oz., 14 oz when packed

DU-Series, the OEMs choice for switchboard and process indication

- DU-35AC11/5AC amps, Scaled RMS. (1 or 5 Amp Internal shunt), 3.5 digit
- DU-35ACIRMS1/5 ..AC amps, True RMS. (1 or 5 Amp Internal shunt), 3.5 digit
- DU-40AC11-5AC amps, Scaled RMS. (1 or 5 Amp Internal shunt), 4 digit
- DU-35ACAC volts, Scaled RMS. 199.9/700V AC Header Selectable Ranges, 3.5 digit
- DU-35ACRMSAC volts, True RMS 199.9/700V AC Header Selectable Ranges, 3.5 digit
- DU-40ACAC volts, Scaled RMS. 700.0V AC full scale, 4 digit
- DU-35HZ15.0Hz to 199.9Hz or 15/500Hz. Up to 700V AC input, 3.5 digit
- DU-35DC volts ±2V/±20V/±200V Header Selectable Ranges, 3.5 digit
- DU-35MVDC mV ±50mV, ±100mV, ±200mV Header Selectable Ranges, 3.5 digit

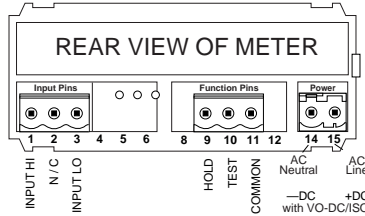
- DU-45DC volts ±2V/±20V/±200V Header Selectable Ranges, 4.5 digit
- DU-45MVDC mV ±50mV/±100mV/±200mV Header Selectable Ranges, 4.5 digit
- DU-35CLProcess 4 to 20mA (100.0), easily user scalable, 3.5 digit
- DU-35CLEProcess 4 to 20mA (100.0) with 24V DC excitation, scalable, 3.5 digit
- DU-45CLProcess 4 to 20mA (100.00), easily user scalable, 4.5 digit
- DU-35PPressure, strain gage and load cell, 4 and 6 wire, 5V DC excitation, Header Selectable Sensitivity 2mV/V, 5mV/V, 10mV/V, 20mV/V, 3.5 digit
- DU-35J/KOrder J or K Thermocouple and °C or °F, 3.5 digit
- DU-35RTD100Ω platinum RTD, 3 or 4 wire, order °C or °F and 0.1° or 1°, 3.5 digit

Functional Diagram



Connector Pinouts

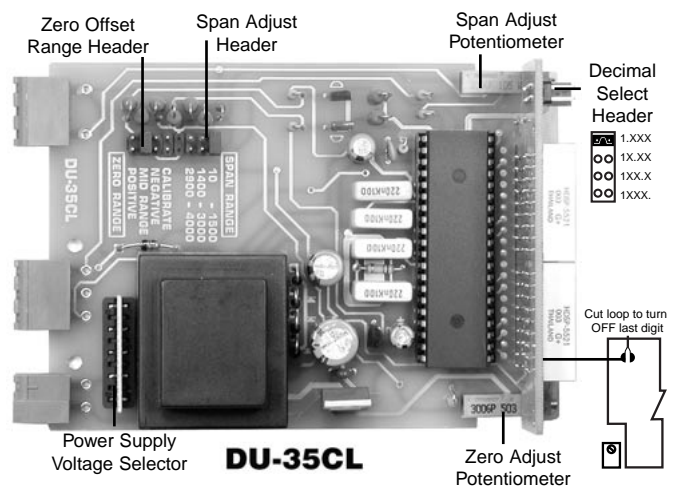
This meter is supplied with plug-in type screw terminal connectors. The power supply pins (14 & 15) have a unique plug and socket outline to prevent cross connection. (see DU Connectors)



WARNING: AC and DC input signals and power supply voltages can be hazardous. Do Not connect live wires to screw terminal plugs, and do not insert, remove or handle screw terminal plugs or internal jumper clips with live wires connected to the meter.

- Pin 1 - Signal Input High:** Signal high input for the meter. The 4-20mA current enters on this pin.
- Pin 3 - Signal Input Low:** Signal low input for the meter.
- Pin 9 - Hold Reading:** If this Pin is left unconnected, the meter will operate in a free-running mode. When this pin is connected to the Hold/Test Common Pin 11, the meter will latch up. A/D conversions will continue, but the display will not be updated until Pin 9 is disconnected from the Hold/Test Common pin 11.
- Pin 10 - Display Test:** All numeric display segments will light up when this pin is connected to the Hold/Test Common Pin 11.
- Pin 11 - Hold/Test Common:** The Hold and Display Test Pins have to be connected to this pin to activate their respective functions.
- Pins 14 & 15 - AC Power Input:** These pins are the Power Input pins for the meter. All DU-Series meters sold in USA are pre-configured at the factory for 100/120V AC operation. To re-configure for 200/240V AC operation, reverse the AC Power Voltage Select. (see Selecting Power Supply Voltage)

Component Layout

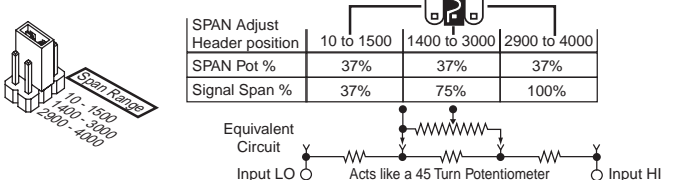


Signal Conditioning Components

SPAN To the Right Front Turn Clockwise to Increase Reading

SPAN Potentiometer (Pot)
The 15 turn SPAN Pot is always on the right side (as viewed from the front of the meter). Typical adjustment is 37% of the input signal range.

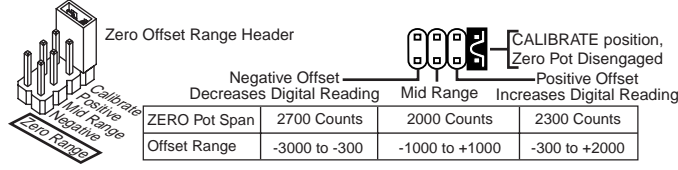
SPAN ADJUST Header
This three position header enables the SPAN Pot, in three equal overlapping 37% steps, to precisely scale down the input Signal Span, to provide any required Digital Display Span. Without any scaling or offset, a 4mA to 20mA input would produce a digital output of 1000 to 5000, which is a Digital Display Span of 4000 counts.



ZERO To the Left Front Turn Clockwise to Increase Reading

ZERO Potentiometer (Pot)
The ZERO Pot is to the left of the SPAN Pot. It enables the Digital Display Span to be offset 2000 to 2700 counts, depending on the Zero Offset Range Header position selected.

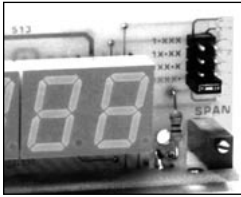
ZERO OFFSET RANGE Header
This four position header enables the ZERO Pot to offset the Digital Display Span -3000 to +2000 counts with a user selectable Negative offset, Mid-range (- & + offset), Positive offset, and a Calibrate position (ZERO Pot disengaged). The Calibrate position facilitates a simple two step calibration with no interaction between Span and Offset.



Calibration Procedure

- The first step** is to disengage the ZERO Pot and scale down the Signal Span input to produce the desired Digital Display Span output.
- Signal Span** is defined as the total change of signal input that would be required for a specific change of the Digital Display. The largest Signal Span that can be specified with a 4 to 20mA input is 16mA. A 4mA Signal Span proportionately scaled can meet full scale display accuracy.
- Digital Display Span** is defined as the exact total in counts, that the display would change within a specific Signal Span. The largest Digital Display Span that can be displayed is -1999 to +1999 (4000 counts). 16mA can not display +4000, so instead 4mA can be scaled to +1000.
- The second step** is to select a Zero Offset Range and offset the Digital Display Span with the ZERO Pot, until the desired reading is displayed.
- Maximum offset** is -3000 to +2000 counts. A Digital Display Span of 4000 counts requires an offset of -3000 to display -1999 to +1999.
- For example:** A 4 to 20mA input to read -40.0°C to +199.9°C
Signal Span = 16mA, Digital Display Span = 2400 counts.
- Remove the meter from its case and set the Zero Offset Range Header to the Calibrate position. Select the 1400 - 3000 position on the Span Adjust Header and slide the meter back into the case.
 - Connect power to the meter and apply 4mA (25% of 16mA). Adjust the SPAN Pot until the display reads +600 (25% of 2400). The meter is now scaled for a Signal Span of 16mA and a Digital Display Span of 2400 counts. In the example 4mA should read -400 and 20mA read 1999, therefore the Digital Display Span should be offset by -1000.
 - Disconnect power and remove the meter from the case, select the Negative offset position on the ZERO OFFSET RANGE Header, and slide the meter back into the case.
 - Connect power to the meter, apply 4mA and adjust the ZERO Pot until the display reads -400. With the Digital Display Span now offset by -1000 counts, the meter will read -400 for a 4mA input, and read +1999 for a 20mA input. Select decimal point 1XX.X to display -40.0 to +199.9. Then apply the self adhesive °C symbol (from the Face Plate Descriptor sheet provided) to complete the calibration.

Decimal Point Selection



Decimal selection is made on the front of the display board by moving the jumper to the indicated position on the header for the decimal required.

Rear Selection of Decimal Points

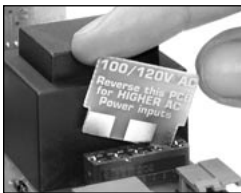
An optional output board is available that provides access to all decimal points via a rear PCB edge connector.

Opening Back Panel



To open back panel, insert a flat screwdriver or similar instrument in both slots on the top of the case and pry open. The DU-Series meters slide out from the rear of the case as a complete assembly.

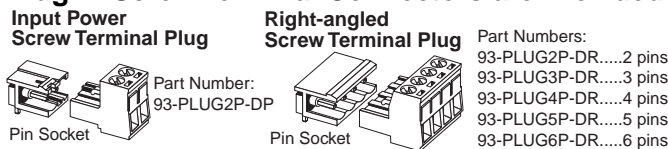
Selecting Power Supply Voltage



This unique voltage selector PCB displays the operating voltage selected. To change the voltage, disconnect power to the meter. Remove the selector, reverse the selector and fully re-insert it in the socket. This selector is not required for optional power supplies.

DU-Series Connector Options

Plug-in Screw Terminal Connectors are Provided

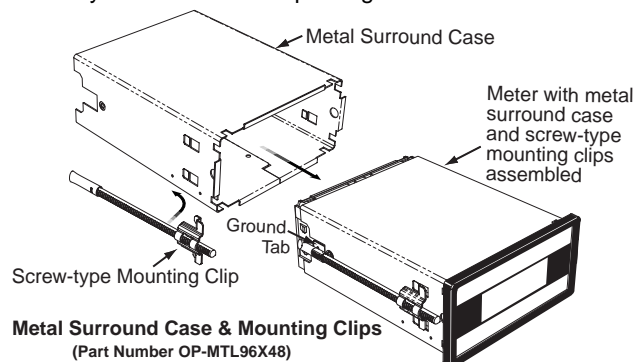


Spade Lug pinouts and insulated quick disconnects may still be ordered as an option. P/N.:CN-SPADE.

Metal Surround Case Option

The meter's plastic case is made from fire retardant polycarbonate. A metal surround case can be ordered to enhance the meter's fire retardant capabilities and also provide shielding against electromagnetic interference (EMI). The metal case slides over the polycarbonate case and is held firmly in place by spring-type non-return clips. The Metal Surround Case must be factory installed on the polycarbonate case and once installed, it cannot be removed in the field.

With the metal case in place, the meter's standard ratchet-type mounting clips can not be used. Instead a pair of screw-type DIN standard mounting clips are provided, which clip into holes on the side of the metal case and tighten against the rear of the panel. A ground tab on the metal case enables the metal case to be easily connected to the panel ground.



Face Plate Descriptors

AC	Ω	kV	KVAR	m ³ /hr	Hz	RPM
V	mV	min	PF	°F	°C	Cosθ
DC	x10kN	μA	PSIG	mS	kg/cm ²	psi
kW	W	KWH	pH	%	K	kPa
A	mbar	mA	MW	KA	RPS	MWH
mWs	μm	kW/s	l	l/sec	ml	cm
ORP	mm/s	1/min	mm	kg/sec	lbs	kg/hr
FT	bars	min ¹	m/min	Mvars	μV	dB

To customize the face plate, each DU-meter is supplied with a white printed clear adhesive label containing various popular descriptors. Choose the descriptor desired, peel off the adhesive backing and align the descriptor in the center right of the faceplate.

Custom Face Plates



Texmate Produces Thousands of Custom OEM Face Plates

Have Texmate Design and Build a Custom Face Plate to Suit your Next project!

- Custom face plates have a non-recurring artwork charge. A serial number is then assigned to each artwork, to facilitate re-ordering.

- Small Run or One-Off custom face plates incur an installation charge, and are generally printed on a special plastic film, which is then laminated to custom faceplate blanks as required.
- Large Run (250 pieces min): custom face plates are production silk screened, issued a part number, and held in stock for free installation as required by customer orders.
- OEMs may also order Custom Meter Labels, Box Labels Custom Data Sheets and Instruction Manuals.

Optional Display Styles



DU Series Above-Center Display Option



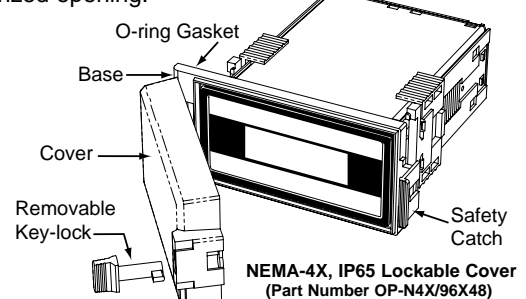
0.8" LED Options available in Lynx Family

To match all display styles, DU-Meters have an optional display and faceplate with the digits positioned above center. (see Display Options)

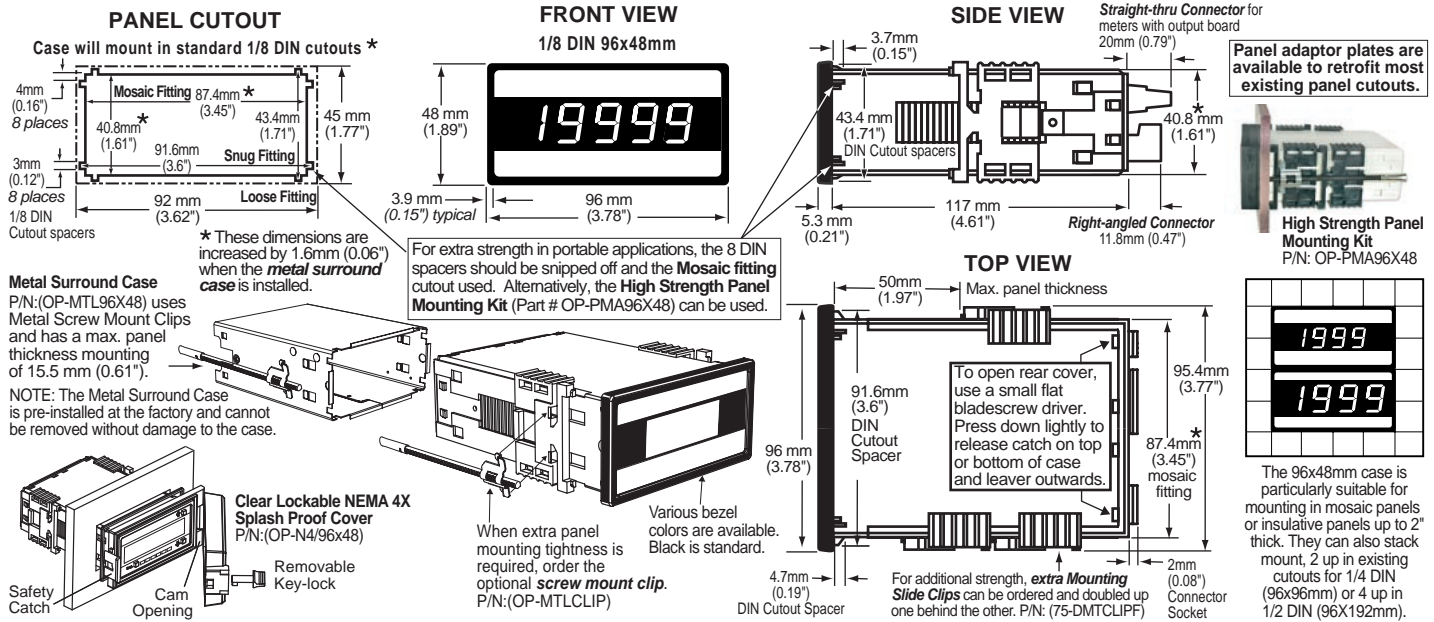
For 0.8" LEDs in 1/8 DIN cases order Lynx family DX-35 and DX-40 w/ LR or LG displays and input modules that match DU-Series inputs.

Clear Lockable Water-proof Cover

The clear lockable cover is designed to be dust and water proof to NEMA-4X, IP65 standards. The assembly consists of a base and cover with a cam hinge and key-lock fastening mechanism. An O-ring, or neoprene gasket forms a seal between the base and the panel. The cam hinge prevents the cover from closing when opened until pushed closed. The cover has a tapered recess that, when closed, forms a seal with a tapered spigot on the base. A key-lock employs a cam locking device to force the spigot into the recess, ensuring seal integrity. A safety catch keeps the cover closed even when the key is removed, and the keyhole can be used to attach a safety seal clip, preventing unauthorized opening.



DU Case Dimensions and Panel Cutouts



Ordering Information

Standard Options for this Model Number

Part Number	Description
▶ BASIC MODEL NUMBER	Includes plug in type screw terminals, standard display and standard power supply unless optional versions are ordered.
DU-35CL	DPM, Process 4 to 20mA (100.0), easily user scalable
▶ DISPLAY	
STANDARD	Red LEDs, 0.56 inch high
DU-BRIGHT	Super bright Red LEDs, 0.56 inch high
DU-GREEN	Green LEDs, 0.56 inch high
DU-GREEN 4.5D	Dummy Zero Display Option w/ Green LEDs
DU-RED4.5D	Dummy Zero Display Option w/ Green LEDs
DU-35HI/BRT	Above center position, .56 inch, Bright Red LED
DU-35HI/GRN	Above center position, .56 inch, Green LED
DU-35HI/RED	Above center position, .56 inch, Red LED
▶ POWER SUPPLY	
STANDARD	100/120 or 200/240VAC User selectable
V0-DC/ISO	Isolated auto-sensing AC/DC 9 to 36 VDC/12 to 24 VAC
V0-24V	Isolated transformer 12 VAC or 24 VAC user selectable
▶ SPECIAL OPTIONS (Specify Inputs or Outputs & Req. Reading)	
HD-CHANGE	Range change from the standard input as shown in BOLD type
CB-FS35	Non-Std Range and Scale Changes for all DU-35 series

WARRANTY

Textmate warrants that its products are free from defects in material and workmanship under normal use and service for a period of one year from date of shipment. Textmate's obligations under this warranty are limited to replacement or repair, at its option, at its factory, of any of the products which shall, within the applicable period after shipment, be returned to Textmate's facility, transportation charges pre-paid, and which are, after examination, disclosed to the satisfaction of Textmate to be thus defective. The warranty shall not apply to any equipment which shall have been repaired or altered, except by Textmate, or which shall have been subjected to misuse, negligence, or accident. In no case shall Textmate's liability exceed the original purchase price. The aforementioned provisions do not extend the original warranty period of any product which has been either repaired or replaced by Textmate.

Special Options and Accessories

Part Number	Description
▶ ACCESSORIES (Specify Serial # for Custom Artwork Installation)	
75-DBBZ9648F	Black Bezel for 96x48mm Case
75-DMTCLIPF	Side Slide Brackets (2 pc) - extra set, extra strength
76-DU35G	Replacement DU Series grey lens for Green LEDs
76-DU35R	Replacement DU Series red lens for Red LEDs
76-DUPP/N	Anti-glare protective front lens plate for DU Series
93-PLUG2P-DP	Extra Screw Terminal Conn., 2 Pin Power Plug
93-PLUG3P-DR	Extra Screw Terminal Conn., 3 Pin Plug
CN-SPADE	Spade Lug pinouts and Insulated quick disconnects
DN-CAS96X48A	Complete 96x48mm Case with bezel
OP-DUEXTDP	Option for External Decimal Point
OP-MCLP96X48	Screw Mounting Clips (2 pc) to screw tighten slide brackets
OP-MTL96X48	Metal Surround Case includes metal mounting clips
OP-N4X/96X48	Clear Lockable Water-proof cover, Nema 4X, IP65
OD-KIT-1	Replacement Crimp-on Quick Disconnects (7 per Set)
ART-FS-S/D	NRC for Artwork & set-up Custom Faceplate and/or Descriptor
ART-FS-S/D/C	NRC for Artwork & set-up Custom Faceplate and Custom Logo
ART-FS-001	Produce & Install Custom Faceplate per meter - 1 color no-min
ART-FS-002	Produce & Install Custom Faceplate per meter - 2 color no-min
ART-FS-003	Produce & Install Custom Faceplate per meter - 3 color no-min
ART-FL-001	Custom Faceplate, 250 piece Min. - 1 color
ART-FL-002	Custom Faceplate, 250 piece Min. - 2 color
ART-FL-003	Custom Faceplate, 250 piece Min. - 3 color

Many other options and accessories are available. See full price list for more details. Prices subject to change without notice.

USER'S RESPONSIBILITY

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995 Park Center Drive • Vista, CA 92081-8397

Tel: 1-760-598-9899 • USA 1-800-839-6283 • That's 1-800-TEXMATE

Fax: 1-760-598-9828 • Email: sales@texmate.com • Web: www.texmate.com

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For product details visit www.texmate.com

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