# Loop Powered,
# Multi Purpose Indicator
## for universal applications

**mA**

**Ex i**

**Application examples:** *Marine applications*
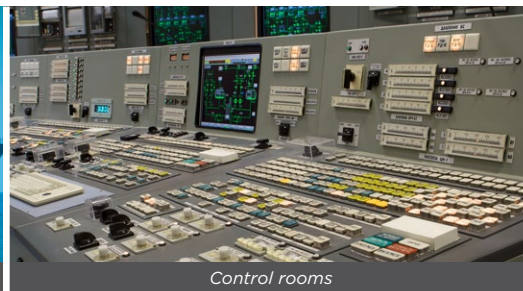
*Control rooms*

*Food industry*

**The D-Series is a front panel mount indicator, controller and monitoring system for measurement applications in industrial environments. It is the robust alternative for your existing, not waterproof, panel meters.**

## Advantages

- Unique, robust IP66, IP67 (NEMA Type4X) panel mount front enclosure made of die cast aluminum, allowing even big jets of water and total immersion.
- Intuitive "Know one, know them all!" configuration menu, saving time, cost and aggravation.
- Resistant to harsh weather conditions: rain, snow, salty atmospheres.
- Only a few inches depth clearance for smaller, low cost panels and panel doors.

## Features

- Universal loop powered indicator.
- Input signal: 4 - 20mA with ultra low voltage drop <1V DC.
- Displays the actual value, measuring unit and loop current.
- Very large 26mm (1") high digits.
- Piegraph indication: ten segments.
- LED backlight circuit, separated from the input circuit.
- Selectable engineering units for many different applications:
  L- NL- mL - M³- AM³- NM³ - mg - g - Kg - TON- OZ- GAL - USGAL - IGAL - lb - bbL- cf - CUFt - scf - p - rev - °C - °F - °K - % - M - mm - CM - mtr - inch - Ft - SQFt – Yd - PSI - psig - mbar - MbARG - bar - barg – bara – PA - PAG - KPA – KPAG - MPA - INHG – mmHg - mmH$_2$O - MH$_2$O – INH$_2$O- Ph – mV – mA - A - uS – PPM – RPM or no unit. (others on request).
- Auto backup of settings.
- Ambient temperature -30°C up to +70°C (-22°F up to 158°F).

## Introduction

The D490 is a multi purpose, panel mount indicator to display the actual process value, range and loop current. The measuring unit to be displayed is simply selected through an alfa-numerical configuration menu. No adhesive labels have to be put on the outside of the enclosure: a weather proof and user friendly solution! The configuration of Span, offset and number of decimals is done through software functions, without any sensitive dip-switches or trimmers.

## Hazardous areas

For hazardous area applications, this model is ATEX, IECEx and CSA certified as Intrinsically Safe for gas and dust applications, with an ambient temperature range of -30°C to +70°C (-22°F to +158°F).

## Configuration

All configuration settings are accessed via a simple operator menu which can be password protected. Each setting is clearly indicated with an alphanumerical description, which avoids confusing abbreviations and baffling codes. Once familiar with one D-series product, you will be able to program all models in all series without a manual. All settings are safely stored in EEPROM memory in the event of sudden power failure.

## Backlight

For those applications where readabillity during day and night is an issue, a white backlight is available with separated circuit from the input circuit. The intensity can be adjusted in the configuration menu.

Bright LED backlight.

Very large 26mm (1") digits.

Status indication

Piegraph indication: ten segments.

Resistant to harsh weather conditions like snow,rain and -30°C/-22°F to +70°C/+158°F

Same configuration menu and rugged buttons as the F-Series, in other words: **"Know one, know them all!"**

Robust aluminum IP66/67 (Type4X) front panel enclosure withstands even powerful water jets!

D-Series needs only a few inches depth clearance

Clear 8mm (0.31") alphanumeric digits

## Display

The display has $5\frac{1}{2}$ large 26mm (1") digits to show the main process information. At the bottom line, smaller 8mm (0.31") alfanumerical digits are available to display the measuring unit and additional messages in case of an alarm; range error e.g. With the piegraph, an actual range indication is offered in a single glance. If desired, additional information can be presented after pressing the select key, like the actual loop current and the 0% and 100% process value. The display is a transflective type, which means that a high contrast reading is guaranteed, even in full sunlight. The D490 has a smart display update function incorporated. Related to the lower temperatures, the update frequency of the LCD is tuned automatically to achieve a readable display even at -30°C / -22°F.

All info at a glance

Easy to install

Easy to program

Know one know them all!

Reliable

User-friendly

## Overview application D490

The D-Series is a DIN-sized display and the better alternative for your existing, not waterproof, front panel mount indicators in extreme weather outdoor applications or e.g. in food industries where working environments are often cleaned with powerful water jets. The D490 takes operating energy from an input current (2-wire 4 - 20mA) and reduces installation cost. It accepts a wide range of process instruments, including flow (linear or square root), level, pressure and temperature transmitters. All these process parameters can be displayed in their own engineering units. Alternative field mounted model: D490.



## Signal input

The D490 does accept 4 - 20mA input signals only. The input circuit is separated from the backlight circuit. The input signal type can be tuned and set by the user in the configuration menu without having to adjust any sensitive mechanical dip-switches, jumpers or trimmers.

## Power requirements

The D490 is designed to be a loop powered indicator, which means it takes its operating energy from an input current (2-wire 4 - 20mA).
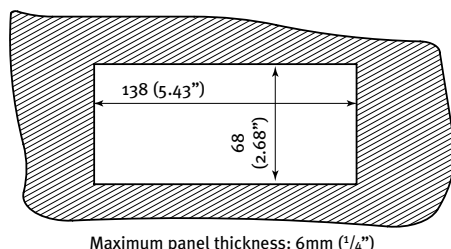


*Waterproof IP66 / 67 (Type4X)*



*Only a few inches depth clearance*
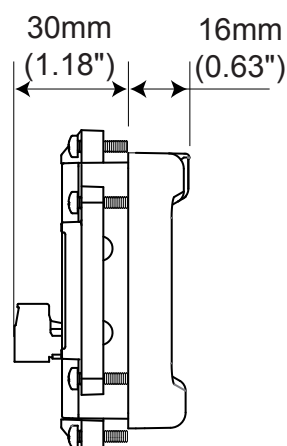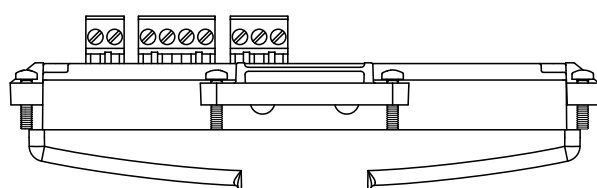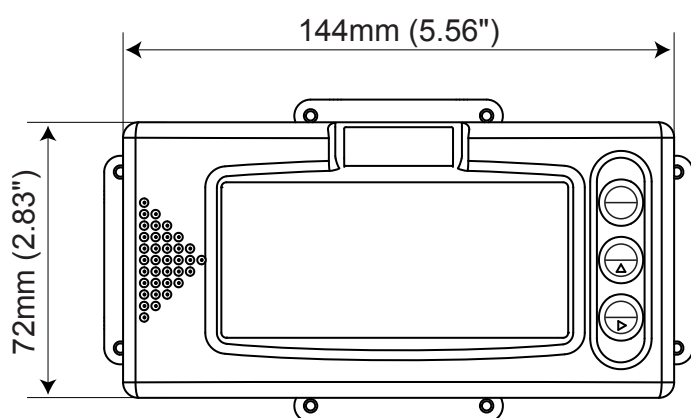
## Enclosures

The D490 is supplied in a unique, robust IP66, IP67 (NEMA Type4X) class panel mount front enclosure made of die cast aluminum, based on a popular DIN sized enclosure of 144 x 72mm. The front enclosure withstands powerful water jets and even total immersion. The maximum thickness of the panel is 6mm (1/4"). The D-Series is the better alternative for your existing, not waterproof, front panel mounted indicators.
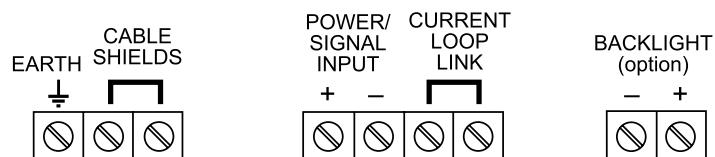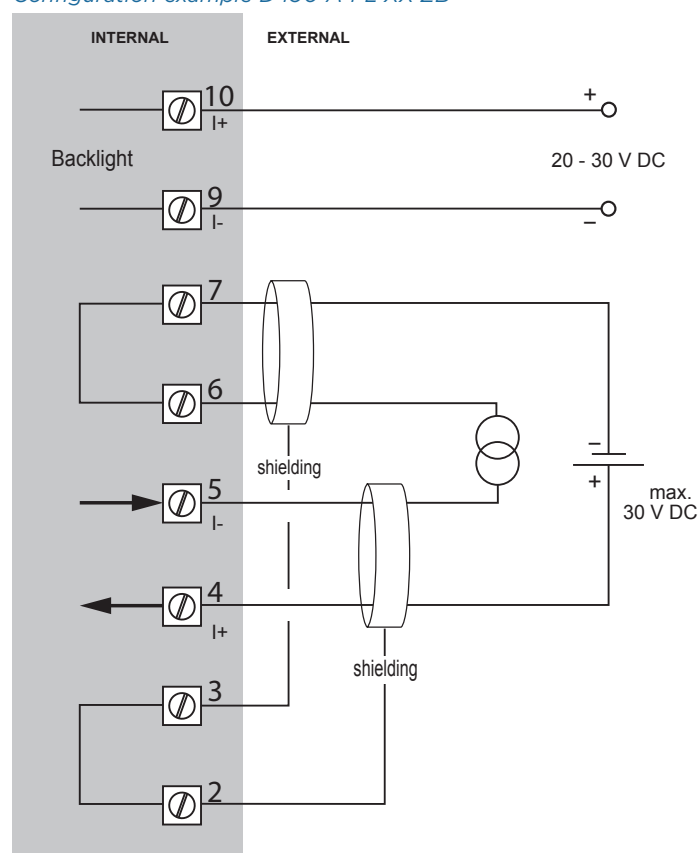
## Panel cut out

138 (5.43")
68 (2.68")

Maximum panel thickness: 6mm ($^1$/$_4$")

## Dimensions enclosure

144mm (5.56")

72mm (2.83")

30mm (1.18")     16mm (0.63")

## Terminal connections D490

EARTH    CABLE SHIELDS    POWER/SIGNAL INPUT   CURRENT LOOP LINK    BACKLIGHT (option)
                          +    −                              −    +

*Configuration example D490-A-PL-XX-ZB*

INTERNAL          EXTERNAL

10 I+                         +
Backlight                     20 - 30 V DC
9 I-                          −

7
6
shielding
5 I-
4 I+
shielding
3
2

max. 30 V DC

## Display example - 90 x 40mm (3.5" x 1.6")

**1683.92**
**GAL/dAY**
RUN

## Hazardous area applications

The D490-XI has been certified according to ATEX and IECEx by KEMA and according CSA c-us for use in Intrinsically Safe applications with an ambient temperature of -30°C to +70°C (-22°F to +158°F).

• The ATEX markings for gas and dust applications are:

     Gas: **II 1 G Ex ia IIC T4 Ga.**

     Dust: **II 1 D Ex ia IIIC T100 °C Da.**

• The IECEx markings for gas and dust applications are:

     Gas: **Ex ia IIC T4 Ga**

     Dust: **Ex ia IIIC T100 °C Da.**

• The CSA c-us markings are:

     **IS Class I/II/III, Division 1, Groups A to G.**

     **Ex ia IIC / Class 1 Zone 0 AEx ia IIC T4.**

It is allowed to connect up to two I.S. power supplies to power the unit and backlight. Consult the certificate for the maximum input and output values of the circuits.

### Electrical safety

The input circuit of the indicator is designed such that it does not influence the intrinsically safe circuit to which it is connected. (In the USA the application is covered by the entity concept.) Input circuit (terminals 4 & 5) in type of explosion protection intrinsically safe Ex ia IIC, with the following parameters: $U_i$=30V, $I_i$=200mA, $P_i$=1.2W, $C_i$=0nF, $L_i$=0mH only for connection to a certified intrinsically safe circuit not exceeding these values.

*Certificate of conformity KEMA 03ATEX1075 X issue 6*

*• IECEx KEM 08.0007X issue 2 • CSA.14.70002331*



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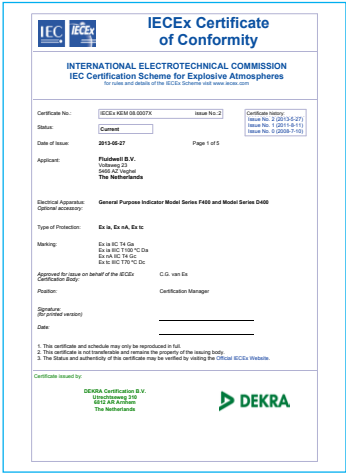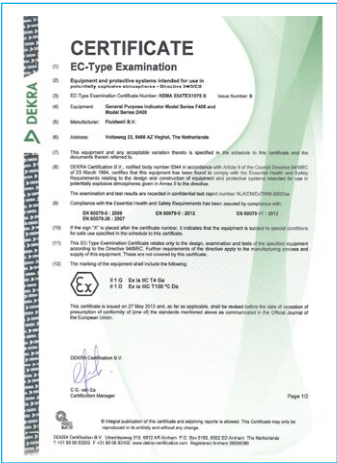
*Intrinsically Safe terminal connections*
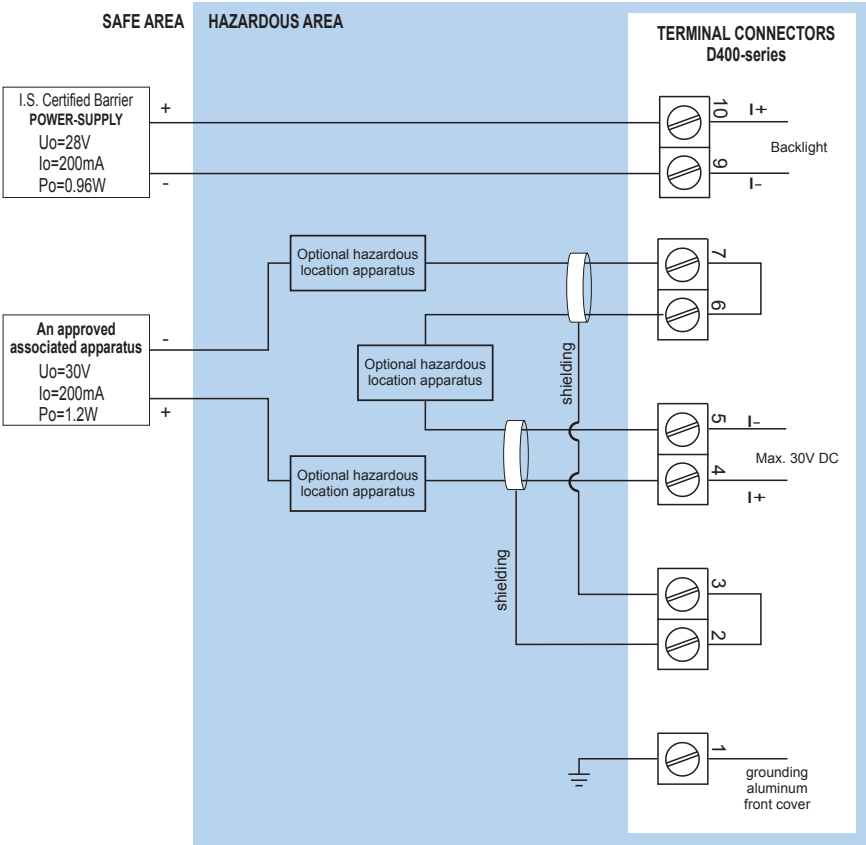
## Display

| | |
|---|---|
| Type | High intensity reflective numeric and alphanumeric LCD, UV-resistant. |
| Dimensions | 90 x 40mm (3.5" x 1.6"). |
| Digits | $5^1/_2$ very large 26mm (1") and eleven 8mm (0.31") digits. Various symbols and measuring units. |
| Piegraph | 10 segment range indication in relation to its measuring range 0 - 100% |
| Option ZB | Transflective LCD with white LED-backlight. Intensitiy can be adjusted in the configuration menu. Good readings in full sunlight and darkness. |

## Ambient temperature

| | |
|---|---|
| Safe areas | -30°C to +70°C (-22°F to +158°F). |
| Intrinsically Safe | -30°C to +70°C (-22°F to +158°F). |

## Directives & Standards

| | |
|---|---|
| EMC | Directive 2014/30/EU, FCC 47 CFR part 15. |
| Low voltage | Directive 2014/35/EU |
| RoHS | Directive 2011/65/EU |
| ATEX / IECEx | Directive 2014/34/EU, IEC 600079-0, IEC 60079-11. IP & NEMA EN 60529 & NEMA 250 |
| CSA | CSA 22.2 No. 157-92. |
| IP & NEMA | EN 60529 & NEMA 250. |

## Data protection

| | |
|---|---|
| Type | EEPROM backup of all settings. Backup of running totals every minute. Data retention at least 10 years. |
| Password | Configuration settings can be password protected. |

## Terminal connections

| | |
|---|---|
| Type | Removable plug-in terminal strip. Wire max. 1.5mm$^2$ and 2.5mm$^2$ |

## Enclosure

| | |
|---|---|
| Window | Polycarbonate window. |
| Sealing | Silicone. |
| Control keys | Three industrial micro-switch keys. UV-resistant silicone keypad. |

## Panel mount enclosure

| | |
|---|---|
| Dimensions | 144 x 72 x 71.4mm (5.67" x 2.83" x 2.81") - W x H x D according DIN 43700 / IEC 61554. |
| Panel cut-out | 138 x 68mm (5.43" x 2.68") L x H. |
| Material | Die-cast aluminum front panel + GRP back enclosure. |
| Protection | IP66, IP67 (NEMA Type4X) at the front-side. |
| Weight | 325 gr. |
| Panel thickness | Max. 6mm ($^1/_4$"). |

## Intrinsically Safe (Type XI)

| | |
|---|---|
| ATEX | Gas: II 1 G Ex ia IIC T4 Ga. Dust: II 1 D Ex ia IIIC T100 °C Da. |
| IECEx | Gas: Ex ia IIC T4 Ga. Dust: Ex ia IIIC T100 °C Da. |
| CSA c-us | IS Class I/II/III, Division 1, Groups A to G. Ex ia IIC / Class 1 Zone 0 AEx ia IIC T4. |
| Ambient Ta | -30°C to +70°C (-22°F to +158°F). |

## Power requirements

| | |
|---|---|
| Type PL | Input loop powered from sensor signal 4 - 20mA |
| Type ZB | For backlight 20 - 30V DC. Power from IS source ($U_o$ = 28V, $I_o$ = 200mA, $P_o$ = 0.96W max.). |
| Note XI | For Intrinsically Safe applications, consult the safety values in the certificate. |

## Signal inputs - Sensor

| | |
|---|---|
| Type A | (0)4 - 20mA. Analog input signal can be scaled to any desired range within 0 - 20mA. |
| Accuracy | Resolution: 16 bit. Error < 0.01mA / ± 0.05% FS. Low level cut-off programmable. |
| Span | 0.00001 - 199,999 with variable decimal position. |
| Offset | -99,999 / +199,999 units. |
| Update time | Four times per second. |
| Voltage drop | Max. 2.6V DC @ 20mA. |
| Relationship | Linear and square root calculation. |

## Operator functions

| | |
|---|---|
| Displayed info | • Top line: main display value. <br> • Bottom line: measuring unit and messages. <br> • Piegraph: 10 segments related to input signal. <br> • Actual sensor input value in mA. <br> • Displayed value at 0%/100% of the input signal. |

## Displayed information

| | |
|---|---|
| Digits | $5^1/_2$ digits. (height 26mm / 1"). |
| Units | L – NL – mL – M$^3$ – AM$^3$ – NM$^3$ – mg – g – Kg – TON – OZ – GAL – USGAL – IGAL – lb – bbL– cf – CUFt – scf – p – rev – °C – °F – K – % – M – mm – CM – mtr – inch – Ft – SQFt – Yd – PSI – psig – mbar – MbARG – bar – barg – bara – PA – PAG – KPA – KPAG – MPA – INHG – mmHg – mmH$_2$O – MH$_2$O – INH$_2$O – Ph – mA – A – uS – PPM – RPM – no unit. |
| Time units | /SEC – /S – /MIN – /M – /HR – /H – /DAY – /D |
| Note | Selecting "/-----" disables the time unit. |
| Decimals | 0 - 1 - 2 - 3 - 4 or 5. |

| Description | | |
|---|---|---|
| **Model** | **D490** | **Loop Powered, Multi Purpose Indicator.** |
| **Input** | **A** | **4 - 20mA input.** |
| Enclosure | **HB** | **Aluminum panel mount front enclosure.** |
| **Power** | **PL** | **Input loop powered from sensor signal 4 - 20mA - requires type A.** |
| Hazardous | XI | Intrinsically safe, according ATEX, IECEx and CSA c-us. |
| | **XX** | **Safe area only.** |
| Options | ZB | Backlight. |
| | **ZX** | **No options.** |

The **bold** marked text contains the standard configuration: D490-A-HB-PL-XX-ZX.