

# 3½ DIGIT VOLTMETER MODULE LED- / LCD- SERIES



35,1x22,4 mm

## FEATURES

- \* IP65
- \* 2 LED AND 2 LCD TYPES
- \* EASY TO USE OR COMPATIBLE TO DATEL
- \*  $\pm 200\text{mV}$  D.C. FULL SCALE READING

## ORDERING INFORMATION

3½-ST. DVM MODULE, 5V, 2x6 PIN, LED RED	<b>EA 4035-100S</b>
3½-ST. DVM MODULE, 5V, 2x6 PIN, LCD WITH BACKLIGHT	<b>EA 4035-200S</b>
3½-ST. DVM MODULE, 5V, 1x8 PIN, LED RED	<b>EA 4035-300S</b>
3½-ST. DVM MODULE, 5V, 1x9 PIN, LCD WITH BACKLIGHT	<b>EA 4035-400S</b>

# 3½ DIGIT LED VOLTMETER MODULE

**Splashproof**



35,1x22,4 mm

## FEATURES

- \* 200mV D.C. FULL SCALE READING
- \* typ. 50mA @ +5V±5% D.C. POWER SUPPLY
- \* BRIGHT RED
- \* 9.4mm (0.37") DIGIT HEIGHT
- \* PROGRAMMABLE DECIMAL POINTS
- \* LED DISPLAY
- \* DISPLAY BLANKING FACILITY
- \* SPLASH PROOF
- \* AUTO-ZERO AND AUTO-POLARITY

## ORDERING INFORMATION

3½-ST. DVM MODULE, 5V, 2x6 PIN, LED RED

**EA 4035-100S**

**ELECTRONIC  
ASSEMBLY** GM  
BH

LOCHHAMER SCHLAG 17 · D- 82 166 GRÄFELFING  
TEL +49-89-8541991 · FAX +49-89-8541721 · <http://www.lcd-module.de>

# EA 4035-100S

## ELECTRONIC ASSEMBLY

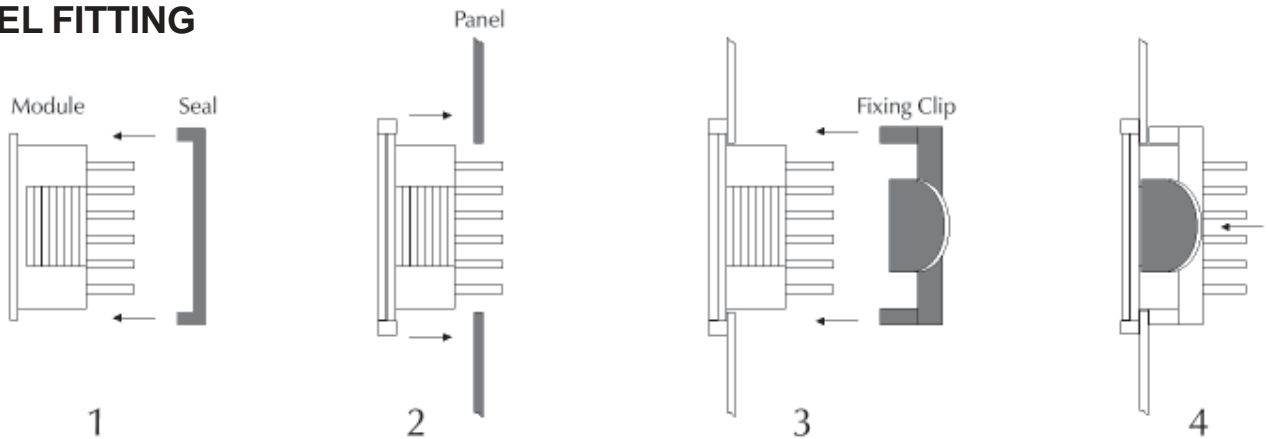
### PRODUCT DESCRIPTION

The EA 4035-100S features a 200mV d.c. measurement range with auto-zero and auto-polarity. Decimal points are user selectable. The EA 4035-100S features a negative rail generator which enables the meter to measure a signal referenced to its own power supply 0V. The bright red LED display ensures excellent readability under low light conditions. It can be blanked in applications requiring low power operation. The module is easily fitted into the panel, using the fixing clip provided. The module's low cost means it will suit high and low volume applications. The design of the panel meter's housing and seal ensures splash proofing in many applications.

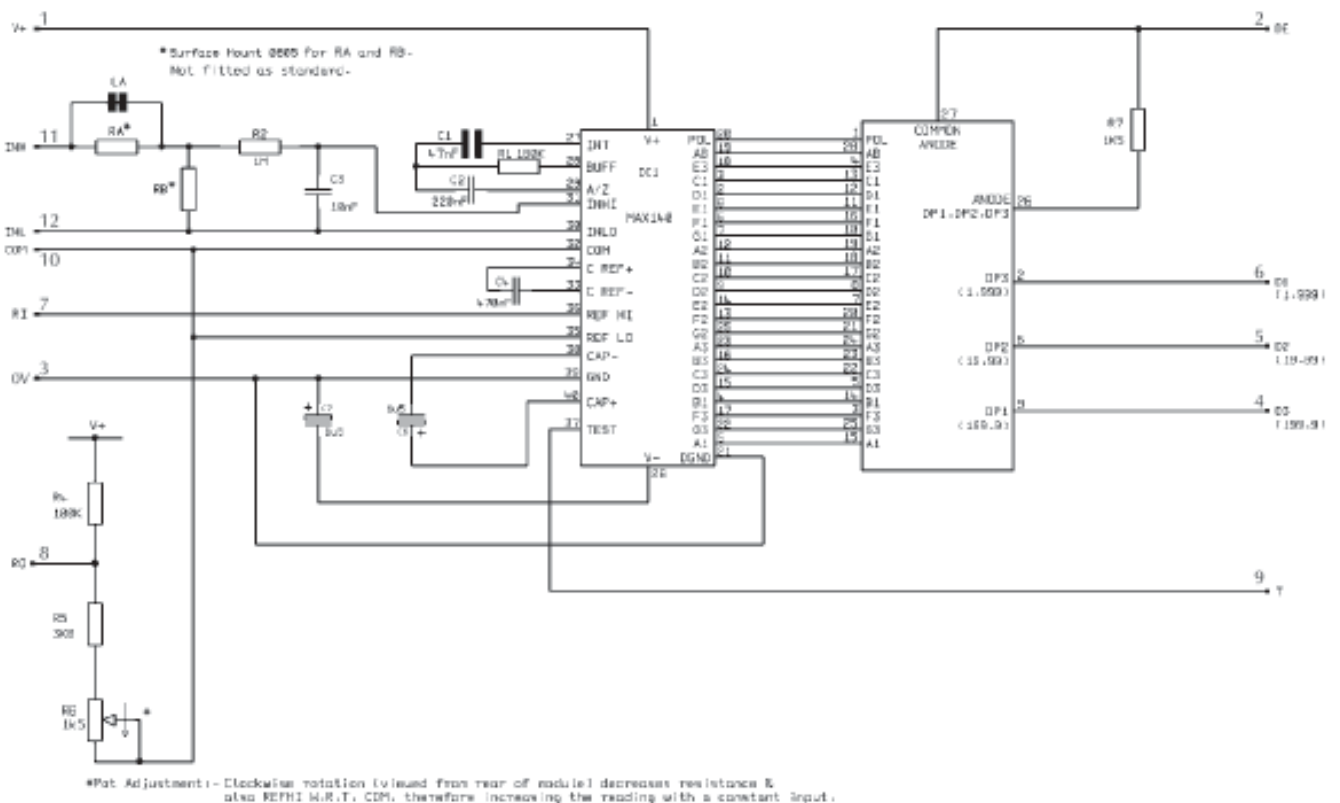
### SAFETY

To comply with the Low Voltage Directive (LVD93/68/EEC), input voltages to the module's pins must not exceed 60Vdc. The user must ensure that the incorporation of the panel meter into the user's equipment conformsto the relevant sections of BS EN 61010 (Safety Requirements for Electrical Equipment for Measuring, Control and Laboratory Use).

### PANEL FITTING



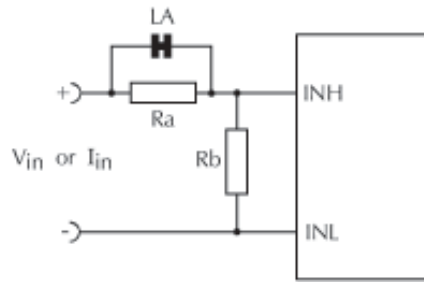
### CIRCUIT DIAGRAM



## ELECTRONIC ASSEMBLY

### SCALING

Two resistors Ra and Rb may be used to alter the full scale reading (FSR) of the meter - see table. The meter will have to be recalibrated by adjusting the calibration potentiometer on the rear of the module.

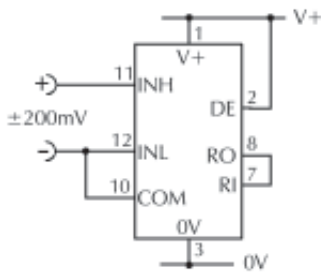


	FSR	Ra	Rb
Voltage Vin	2V	910k**	100k
	20V	1M**	10k
	200V	1M**	1k
	2000V*	1M**	100R
Current Iin	200uA	0R	1k
	2mA	0R	100R
	20mA	0R	10R
	200mA	0R	1R

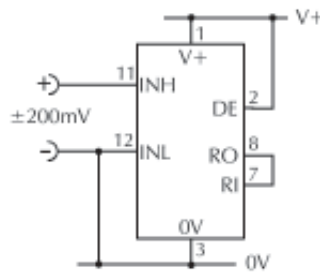
\* Ensure that Ra is rated for high voltage use.  
\*\* Ensure solder link LA is cut.

### APPLICATIONS

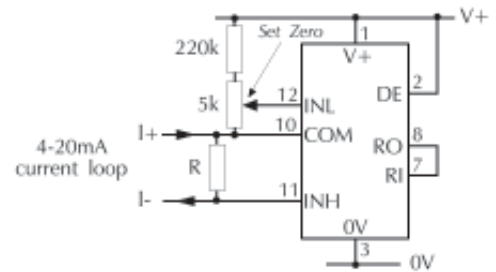
Do not connect more than one meter to the same power supply if the meters cannot use the same signal ground. Taking any input beyond the power supply rails will damage the meter.



Measuring an input voltage referenced to a floating supply, i.e. the input voltage and the meter's power supply are isolated from each other.

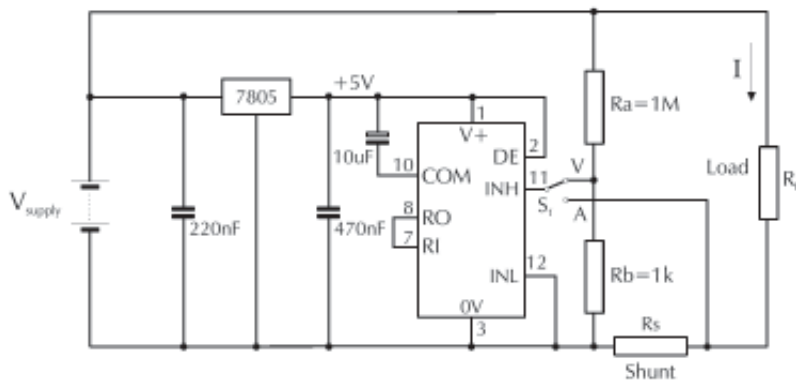


Measuring a single ended input voltage referenced to supply, i.e. the input voltage and the meter's power supply share the same 0V rail.



Measuring a 4-20mA loop current. The meter's power supply must be isolated from the 4-20mA current loop.

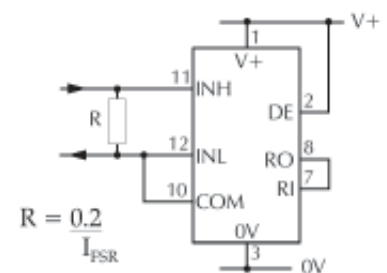
$$R = \frac{\text{Reading at 20mA}}{160}$$



Measuring supply voltage and current to a load.  
S<sub>1</sub> selects between voltage and current measurement.  
Ra and Rb shown scaled for 200V<sub>FSR</sub>

$$R_s = \frac{200mV}{I_{FSR}} \quad (\text{e.g. } 0.1\Omega/400mW \text{ for } 2A \text{ full scale})$$

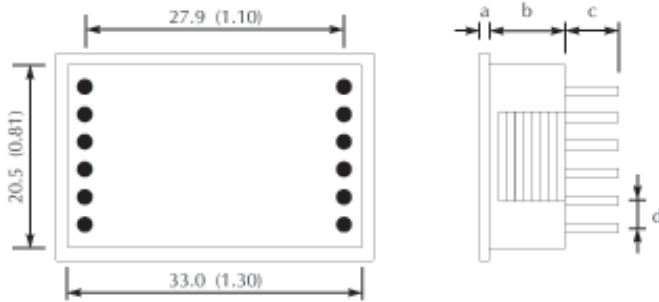
Display DP1, DP2 or DP3, by connecting to 0V, as required.



Measuring current.  
The meter's supply is isolated from the current being measured.

# EA 4035-100S

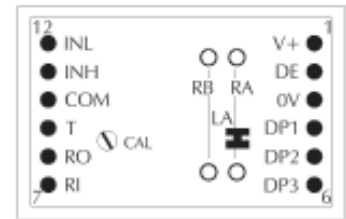
## DIMENSION



all Dimensions are in mm (inch)  
Panel Cutout 34x21,3 mm

a. 0.75 (0.03)  
b. 10.00 (0.39)  
c. 6.00 (0.24)  
d. 2.54 (0.10)

## PINOUT



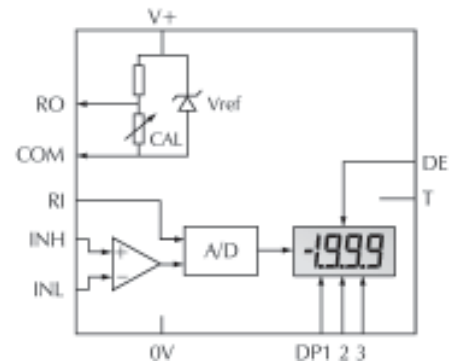
## PIN FUNCTION

PIN FUNCTION		
Pin	Symbol	Function
1	V+	Positive power supply to the meter.
2	DE	Display Enable. Connect to V+ for normal operation. Do not connect to enter low power mode. The display is then blanked, but the voltmeter section continues to operate. In low power mode, the current consumption is reduced to 400uA (typ).
3	0V	0V power supply connection to the meter.
4	DP1	Connect to 0V to display DP1 (199.9).
5	DP2	Connect to 0V to display DP2 (19.99).
6	DP3	Connect to 0V to display DP3 (1.999).
7	RI	Reference voltage input for the meter's A/D converter.
8	RO	Precision reference voltage output. Connect to RI for normal operation.
9	T	Connect to V+ to test the display. All segments will be displayed, except for decimal points.
10	COM	Ground for analogue section of A/D converter. It is actively held at 3.05V (nom) below V+ and must not be allowed to sink excessive current (>100uA) by, for instance, connecting to a higher voltage.
11	INH	Positive measuring input.
12	INL	Negative measuring input.

## ELECTRICAL SPECIFICATIONS

Specification	Min.	Typ.	Max.	Unit
Accuracy (overall error) *		0.1		%(±1 count)
Linearity			±1	count
Sample rate		2.5		samples/sec
Operating temperature range	0		50	°C
Warm-up time		10		minute
Temperature stability		150		ppm/°C
Supply voltage	4.75	5	5.25	V
Supply current (DE connected to V+)		50	90	mA
Supply current (DE connected to 0V)		400		uA
Input leakage current (Vin = 0V)		1	10	pA

## BLOCK DIAGRAM



# 3½ DIGIT LCD VOLTMETER MODULE

**Splashproof**



35,1x22,4 mm

## FEATURES

- \* 9.75mm (0.38") LCD DIGIT HEIGHT
- \*  $\pm 200\text{mV}$  D.C. FULL SCALE READING
- \*  $350\mu\text{A}$  @  $+5\text{V}\pm 5\%$  D.C. POWER SUPPLY
- \* PROGRAMMABLE DECIMAL POINTS
- \* LED BACKLIGHTING
- \* LOW BATTERY WARNING
- \* DISPLAY BLANKING FACILITY
- \* SPLASH PROOF
- \* AUTO-ZERO AND AUTO-POLARITY

## ORDERING INFORMATION

3½-ST. DVM MODULE, 5V, 2x6 PIN, LCD WITH BACKLIGHT

**EA 4035-200S**

**ELECTRONIC  
ASSEMBLY** GM  
BH

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# EA 4035-200S

## ELECTRONIC ASSEMBLY

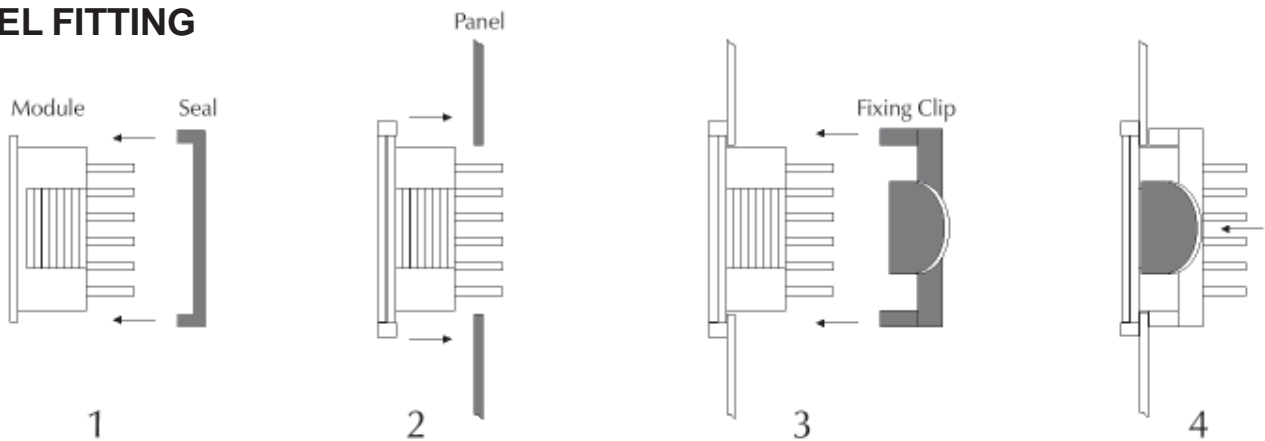
### PRODUCT DESCRIPTION

The EA 4035-100S features a 200mV d.c. measurement range with auto-zero and auto-polarity. Decimal points are user selectable. The EA 4035-200S features a negative rail generator which enables the meter to measure a signal referenced to its own power supply 0V. The bright red LED display ensures excellent readability under low light conditions. It can be blanked in applications requiring low power operation. The module is easily fitted into the panel, using the fixing clip provided. The module's low cost means it will suit high and low volume applications. The design of the panel meter's housing and seal ensures splash proofing in many applications.

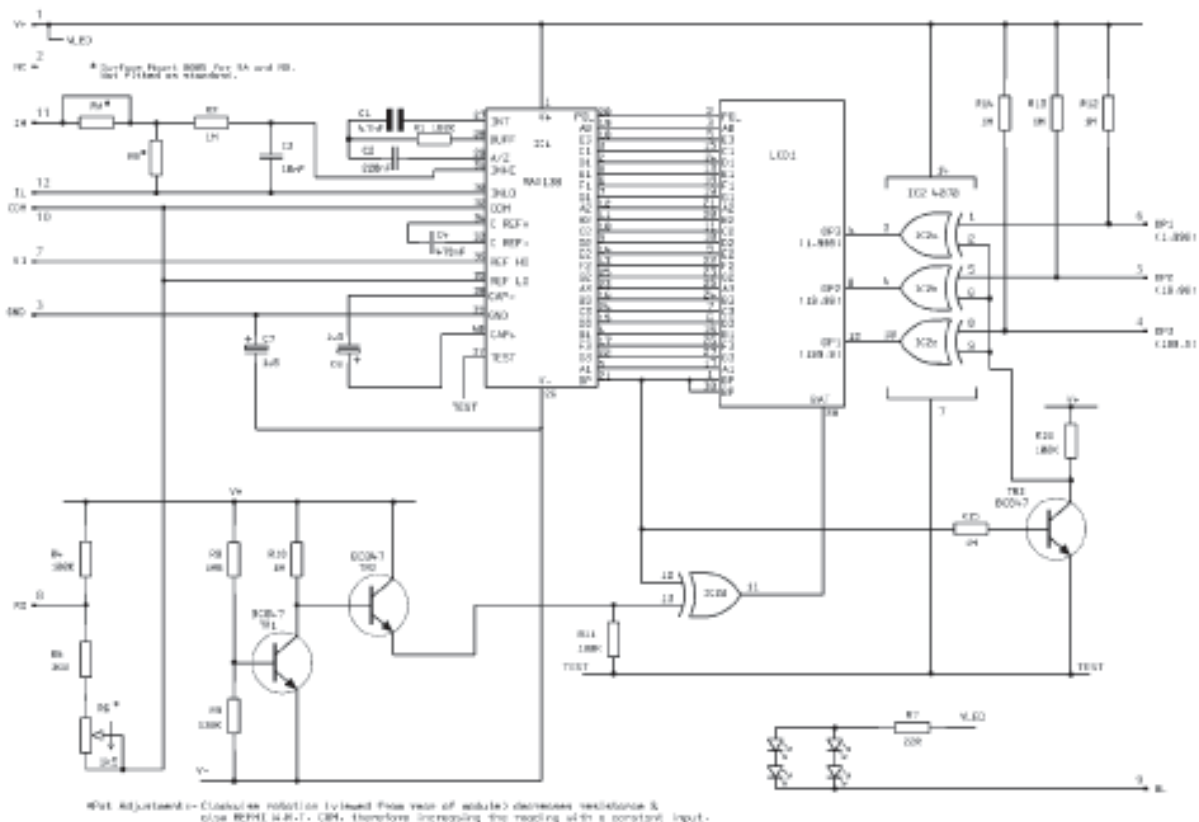
### SAFETY

To comply with the Low Voltage Directive (LVD93/68/EEC), input voltages to the module's pins must not exceed 60Vdc. The user must ensure that the incorporation of the panel meter into the user's equipment conforms to the relevant sections of BS EN 61010 (Safety Requirements for Electrical Equipment for Measuring, Control and Laboratory Use).

### PANEL FITTING



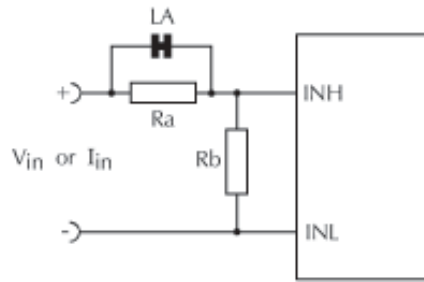
### CIRCUIT DIAGRAM



## ELECTRONIC ASSEMBLY

### SCALING

Two resistors Ra and Rb may be used to alter the full scale reading (FSR) of the meter - see table. The meter will have to be recalibrated by adjusting the calibration potentiometer on the rear of the module.

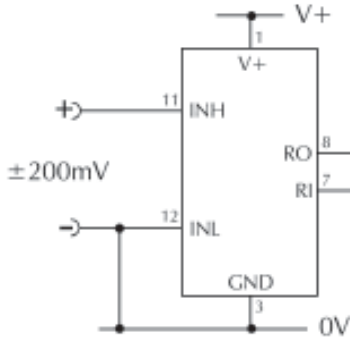


	FSR	Ra	Rb
Voltage Vin	2V	910k**	100k
	20V	1M**	10k
	200V	1M**	1k
	2000V*	1M**	100R
Current Iin	200uA	0R	1k
	2mA	0R	100R
	20mA	0R	10R
	200mA	0R	1R

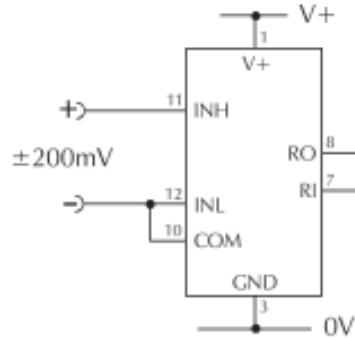
\* Ensure that Ra is rated for high voltage use.  
\*\* Ensure solder link LA is cut.

### APPLICATIONS

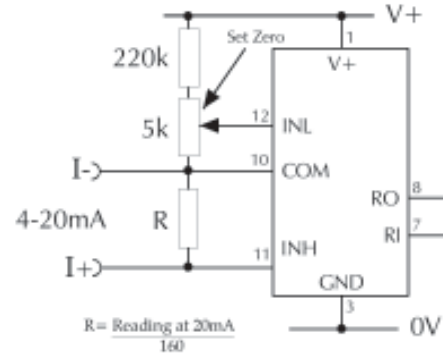
Do not connect more than one meter to the same power supply if the meters cannot use the same signal ground. Taking any input beyond the power supply rails will damage the meter.



Measuring an input voltage referenced to a floating supply, i.e. the input voltage and the meter's power supply are isolated from each other.

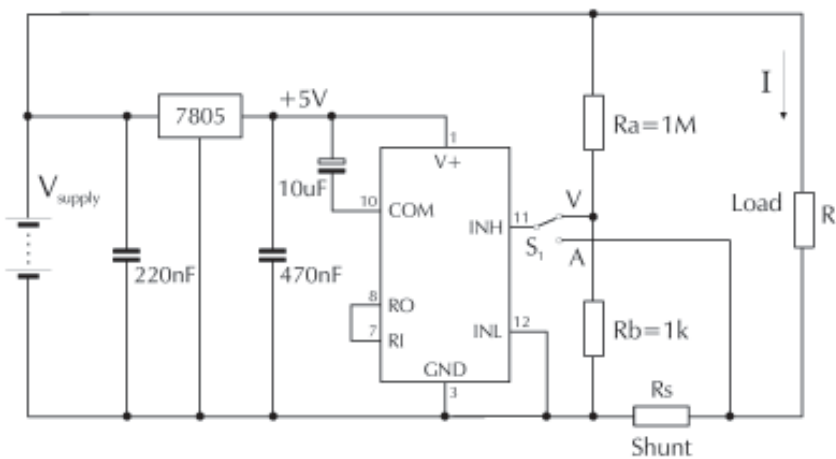


Measuring a single ended input voltage referenced to supply, i.e. the input voltage and the meter's power supply share the same 0V rail.



Measuring a 4-20mA loop current. The meter's power supply must be isolated from the 4-20mA current loop.

$$R = \frac{\text{Reading at 20mA}}{160}$$



Measuring supply voltage and current to a load.  
S<sub>1</sub> selects between voltage and current measurement.  
Ra and Rb shown scaled for 200V<sub>FSR</sub>

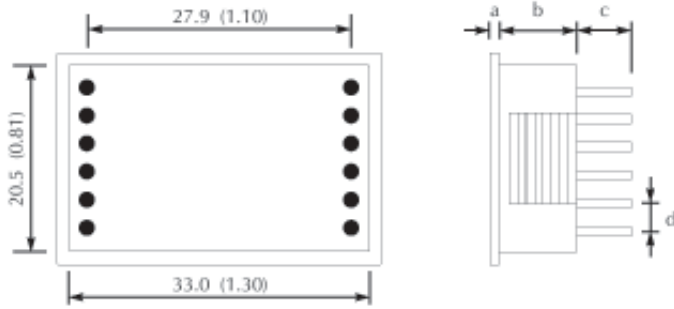
$$R_s = \frac{200mV}{I_{FSR}} \quad (\text{e.g. } 0.1\Omega/400mW \text{ for } 2A \text{ full scale})$$

Display DP1, DP2 or DP3, by connecting to 0V, as required.



# EA 4035-200S

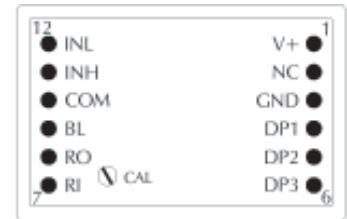
## DIMENSION



all Dimensions are in mm (inch)  
Panel Cutout 34x21,3 mm

a. 0.75 (0.03)  
b. 10.00 (0.39)  
c. 6.00 (0.24)  
d. 2.54 (0.10)

## PINOUT



## PIN FUNCTION

PIN FUNCTION		
Pin	Symbol	Function
1	V+	Positive power supply to the meter and LED backlighting.
2	NC	Not connected.
3	0V	0V power supply connection to the meter.
4	DP1	Connect to 0V to display DP1 (199.9).
5	DP2	Connect to 0V to display DP2 (19.99).
6	DP3	Connect to 0V to display DP3 (1.999).
7	RI	Reference voltage input for the meter's A/D converter.
8	RO	Precision reference voltage output. Connect to RI for normal operation.
9	BL	Connect to GND to switch on the LED backlighting
10	COM	Ground for analogue section of A/D converter. It is actively held at 3.05V (nom) below V+ and must not be allowed to sink excessive current (>100uA) by, for instance, connecting to a higher voltage.
11	INH	Positive measuring input.
12	INL	Negative measuring input.

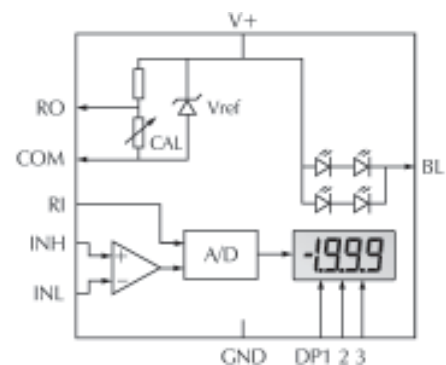
Note:

A negative supply is generated internally and mirrors the positive supply. For example: if V+ is +5V, then the internally generated V- is -5V. When measuring with the input referenced to the same supply rail as that of the panel meter, then the limitations on the input range are (V- +1.5V) to (V+ - 1.5V).

## ELECTRICAL SPECIFICATIONS

Specification	Min.	Typ.	Max.	Unit
Accuracy (overall error) *		0.1		%(±1 count)
Linearity			±1	count
Sample rate		2.5		samples/sec
Operating temperature range	0		50	°C
Temperature stability		100		ppm/°C
Supply voltage	3.5	5	5.25	V
Supply current		350		µA
Backlight Current @5V d.c.		40	80	mA
Input leakage current (Vin = 0V)		1	10	pA

## BLOCK DIAGRAM



**3½ DIGIT LED VOLTMETER MODULE****Splashproof***35,1x22,4 mm***FEATURES**

- \*  $\pm 200\text{mV}$  D.C. FULL SCALE READING
- \* typ. 50mA @ +5V $\pm 5\%$  D.C. POWER SUPPLY
- \* BRIGHT RED
- \* 9.4mm (0.37") DIGIT HEIGHT
- \* PROGRAMMABLE DECIMAL POINTS
- \* BRIGHT RED LED DISPLAY
- \* SIMPLIFIED CONNECTION
- \* SPLASH PROOF
- \* AUTO-ZERO AND AUTO-POLARITY

**ORDERING INFORMATION**

3½-ST. DVM MODULE, 5V, 1x8 PIN, LED RED

**EA 4035-300S**
**ELECTRONIC  
ASSEMBLY**
**GM  
BH**

 LOCHHAMER SCHLAG 17 · D- 82 166 GRÄFELFING  
 TEL +49-89-8541991 · FAX +49-89-8541721 · <http://www.lcd-module.de>

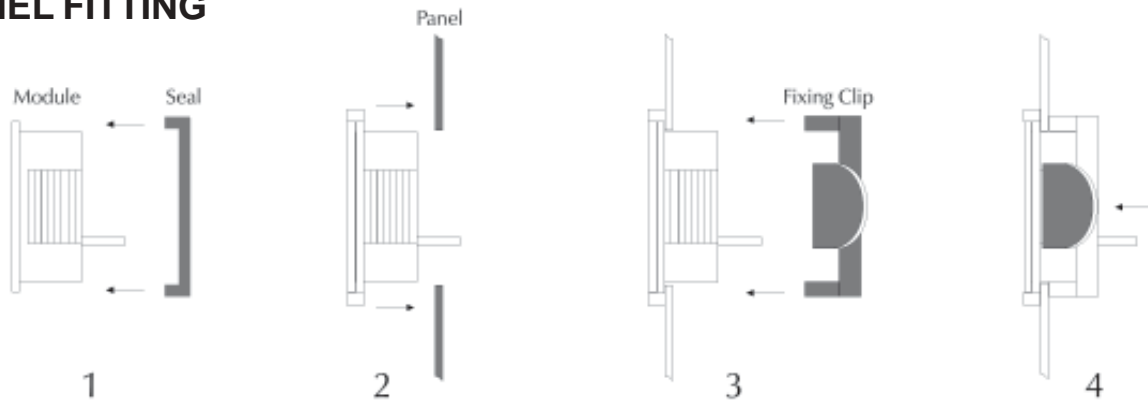
### PRODUCT DESCRIPTION

The EA 4035-300S features a 200mV d.c. measurement range with auto-zero and auto-polarity. Decimal points are user selectable. The EA 4035-300S features a negative rail generator which enables the meter to measure a signal referenced to its own power supply 0V. The bright red LED display ensures excellent readability under low light conditions. It can be blanked in applications requiring low power operation. The module is easily fitted into the panel, using the fixing clip provided. The module's low cost means it will suit high and low volume applications. The design of the panel meter's housing and seal ensures splash proofing in many applications.

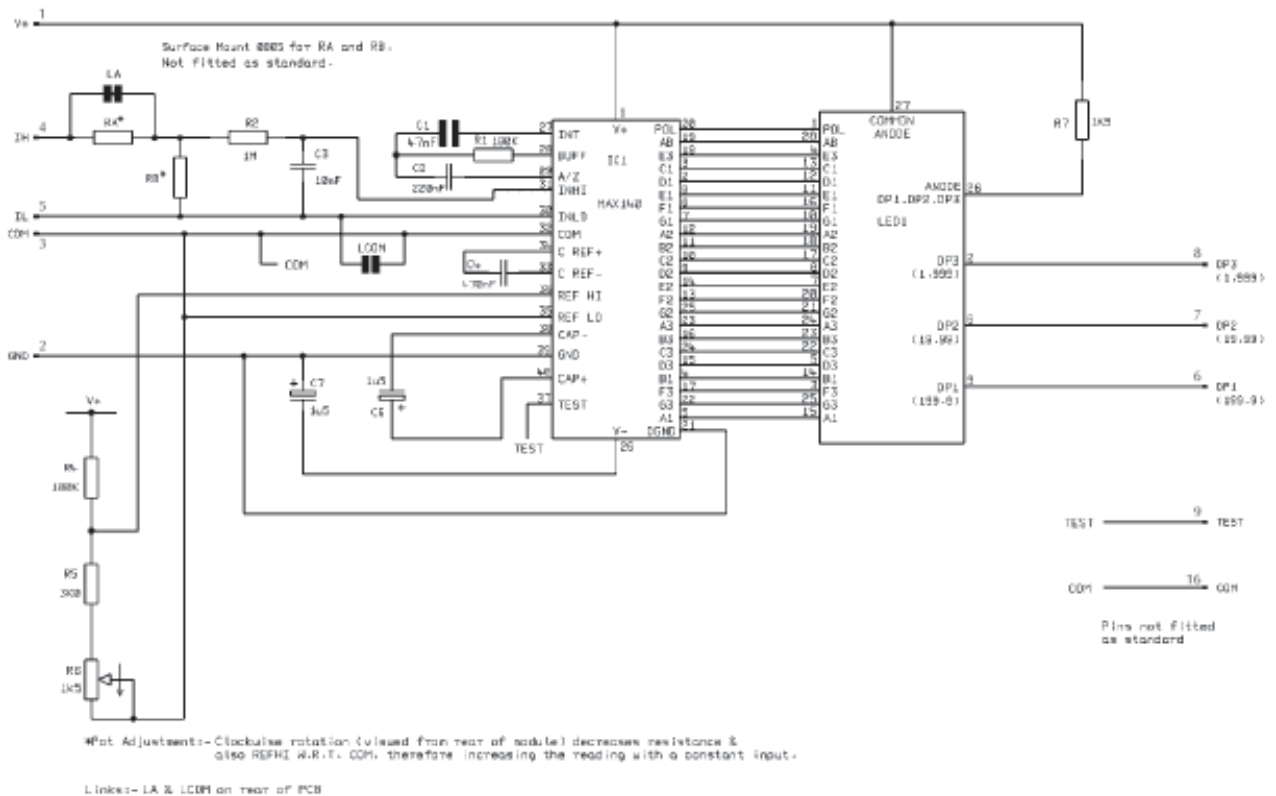
### SAFETY

To comply with the Low Voltage Directive (LVD93/68/EEC), input voltages to the module's pins must not exceed 60Vdc. The user must ensure that the incorporation of the panel meter into the user's equipment conformsto the relevant sections of BS EN 61010 (Safety Requirements for Electrical Equipment for Measuring, Control and Laboratory Use).

### PANEL FITTING



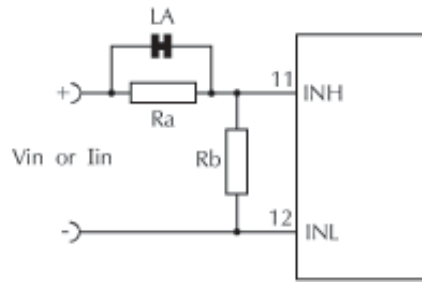
### CIRCUIT DIAGRAM



## ELECTRONIC ASSEMBLY

### SCALING

Two resistors Ra and Rb may be used to alter the full scale reading (FSR) of the meter - see table. The meter will have to be recalibrated by adjusting the calibration potentiometer on the rear of the module.



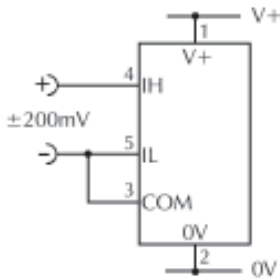
	FSR	Ra	Rb
Voltage Vin	2V	910k**	100k
	20V	1M**	10k
	200V	1M**	1k
	2000V*	1M**	100R
Current Iin	200uA	0R	1k
	2mA	0R	100R
	20mA	0R	10R
	200mA	0R	1R

\* Ensure that Ra is rated for high voltage use.

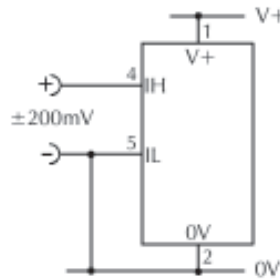
\*\* Ensure solder link LA is cut.

### APPLICATIONS

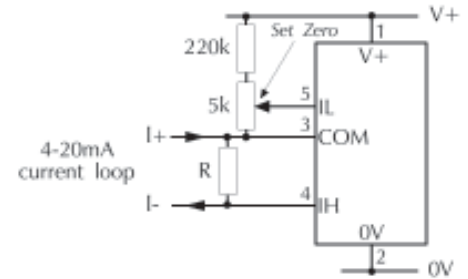
Do not connect more than one meter to the same power supply if the meters cannot use the same signal ground. Taking any input beyond the power supply rails will damage the meter.



Measuring an input voltage referenced to a floating supply, i.e. the input voltage and the meter's power supply are isolated from each other.

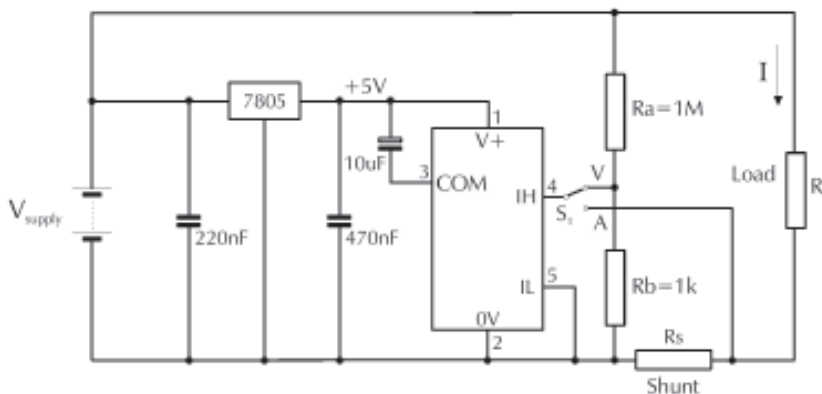


Measuring a single ended input voltage referenced to supply, i.e. the input voltage and the meter's power supply share the same 0V rail.



Measuring a 4-20mA loop current. The meter's power supply must be isolated from the 4-20mA current loop.

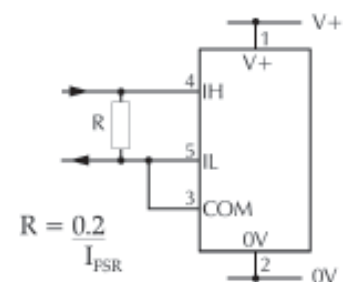
$$R = \frac{\text{Reading at 20mA}}{160}$$



Measuring supply voltage and current to a load. S<sub>1</sub> selects between voltage and current measurement. Ra and Rb shown scaled for 200V<sub>FSR</sub>

$$R_s = \frac{200mV}{I_{FSR}} \quad (\text{e.g. } 0.1\Omega/400mW \text{ for } 2A \text{ full scale})$$

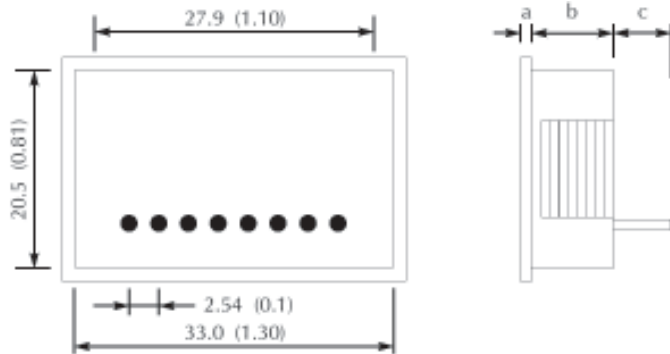
Display DP1, DP2 or DP3, by connecting to 0V, as required.



Measuring current. The meter's supply is isolated from the current being measured.

# EA 4035-300S

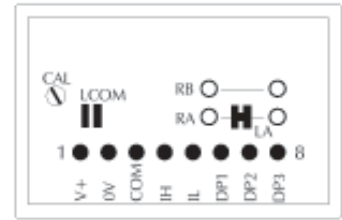
## DIMENSION



all Dimensions are in mm (inch)  
Panel Cutout 34x21,3 mm

a. 0.75 (0.03)  
b. 10.00 (0.39)  
c. 6.00 (0.24)

## PINOUT



Solder Link:

LCOM Normally Open. Connects INL to COM.



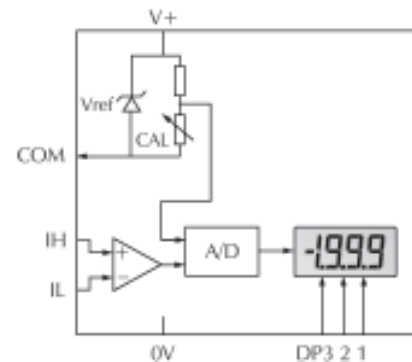
## PIN FUNCTION

PIN FUNCTION		
Pin	Symbol	Function
1	V+	Positive power supply to the meter.
2	0V	0V power supply connection to the meter.
3	COM	Ground for analogue section of A/D converter. It is actively held at 3.05V (nom) below V+ and must not be allowed to sink excessive current (>100uA) by, for instance, connecting to a higher voltage.
4	INH	Positive measuring input.
5	INL	Negative measuring input.
6	DP1	Connect to 0V to display DP1 (199.9).
7	DP2	Connect to 0V to display DP2 (19.99).
8	DP3	Connect to 0V to display DP3 (1.999).

## ELECTRICAL SPECIFICATIONS

Specification	Min.	Typ.	Max.	Unit
Accuracy (overall error) *		0.1		%(±1 count)
Linearity			±1	count
Sample rate		2.5		samples/sec
Operating temperature range	0		50	°C
Warm-up time		10		minute
Temperature stability		150		ppm/°C
Supply voltage	4.75	5	5.25	V
Supply current		50	90	mA
Input leakage current (Vin = 0V)		1	10	pA

## BLOCK DIAGRAM



**3½ DIGIT LCD VOLTMETER MODULE****Splashproof***35,1x22,4 mm***FEATURES**

- \* 9.75mm (0.38") LCD DIGIT HEIGHT
- \*  $\pm 200\text{mV}$  D.C. FULL SCALE READING
- \* 3.5 TO 7V OR 7.5 TO 14V OPERATION
- \* typ. 50mA @ +5V $\pm 5\%$  D.C. POWER SUPPLY
- \* LED BACKLIGHTING (3.5 TO 7V OPERATION ONLY)
- \* PROGRAMMABLE DECIMAL POINTS
- \* LOW BATTERY WARNING
- \* SIMPLIFIED CONNECTION
- \* SPLASH PROOF
- \* AUTO-ZERO AND AUTO-POLARITY

**ORDERING INFORMATION**

3½-ST. DVM MODULE, 5V, 1x9 PIN, LCD WITH BACKLIGHT

**EA 4035-400S**

**ELECTRONIC  
ASSEMBLY** G  
M  
B  
H

LOCHHAMER SCHLAG 17 · D- 82 166 GRÄFELFING  
TEL +49-89-8541991 · FAX +49-89-8541721 · <http://www.lcd-module.de>

# EA 4035-400S

## ELECTRONIC ASSEMBLY

### PRODUCT DESCRIPTION

The EA 4035-400S features a 200mV d.c. measurement range with auto-zero and auto-polarity. Decimal points are user selectable.

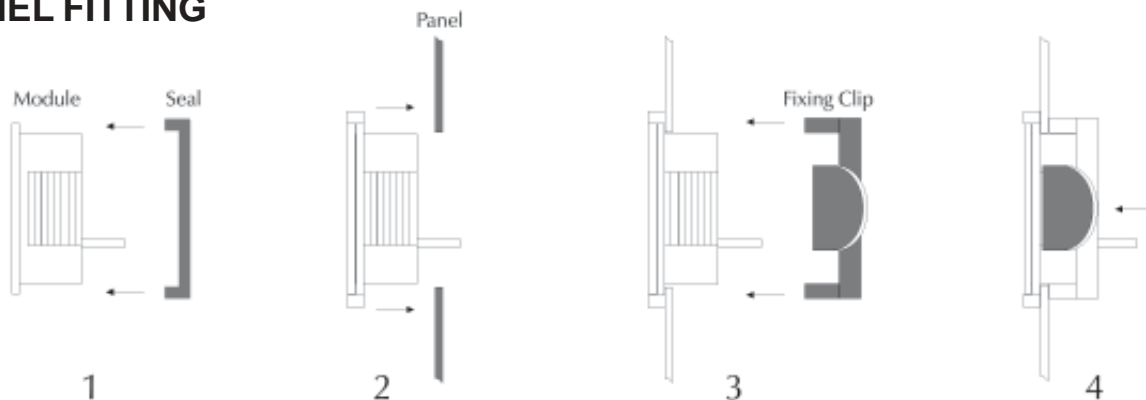
LED backlighting ensures excellent readability under low light conditions. The module is easily fitted into the panel, using the fixing clip provided. The EA 4035-400S features a negative rail generator which enables the meter to measure a signal referenced to its own power supply GND.

low cost means it will suit high and low volume applications. The design of the panel meter's housing ensures splash proofing using the supplied seal.

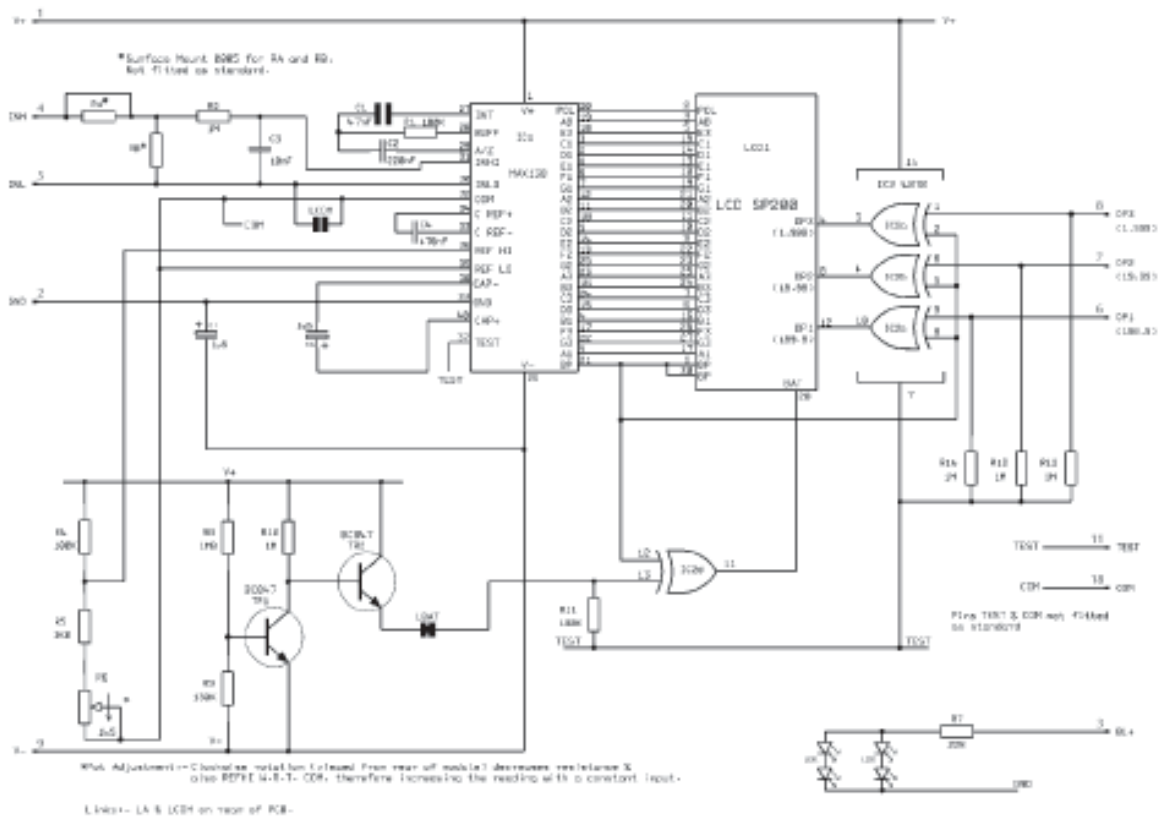
### SAFETY

To comply with the Low Voltage Directive (LVD93/68/EEC), input voltages to the module's pins must not exceed 60Vdc. The user must ensure that the incorporation of the panel meter into the user's equipment conformsto the relevant sections of BS EN 61010 (Safety Requirements for Electrical Equipment for Measuring, Control and Laboratory Use).

### PANEL FITTING



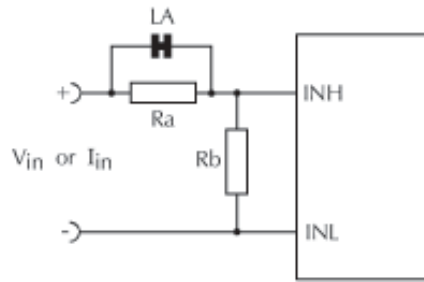
### CIRCUIT DIAGRAM



## ELECTRONIC ASSEMBLY

### SCALING

Two resistors Ra and Rb may be used to alter the full scale reading (FSR) of the meter - see table. The meter will have to be recalibrated by adjusting the calibration potentiometer on the rear of the module.



	FSR	Ra	Rb
Voltage Vin	2V	910k**	100k
	20V	1M**	10k
	200V	1M**	1k
	2000V*	1M**	100R
Current Iin	200uA	0R	1k
	2mA	0R	100R
	20mA	0R	10R
	200mA	0R	1R

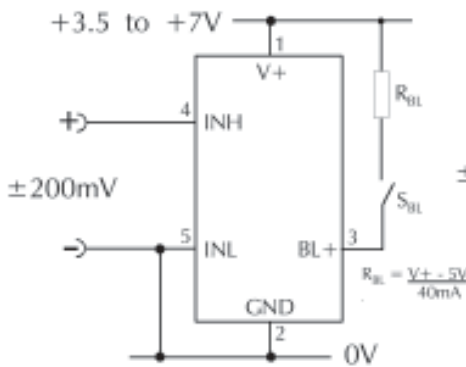
\* Ensure that Ra is rated for high voltage use.

\*\* Ensure solder link LA is cut.

### APPLICATIONS

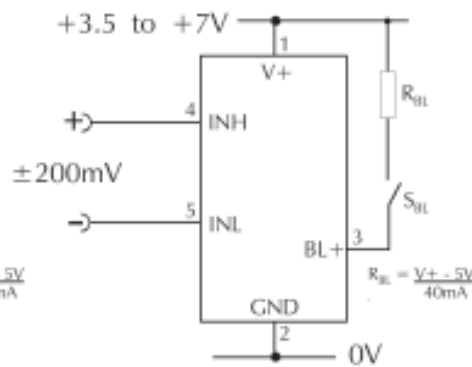
Do not connect more than one meter to the same power supply if the meters cannot use the same signal ground. Taking any input beyond the power supply rails will damage the meter.

#### 3.5 to 7V Meter Power Supply



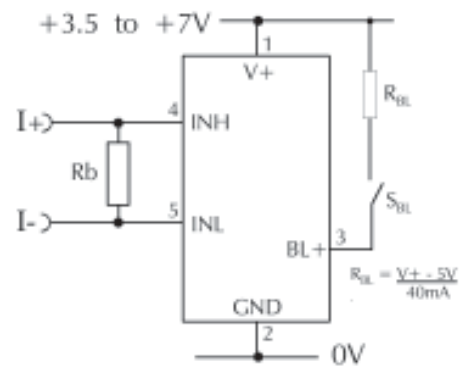
Measuring a single ended input voltage referenced to supply, i.e. the input voltage and the meter's power supply share the same 0V rail.

Ensure solder link LCOM is open.



Measuring an input voltage referenced to a floating supply, i.e. the input voltage and the meter's power supply are isolated from each other.

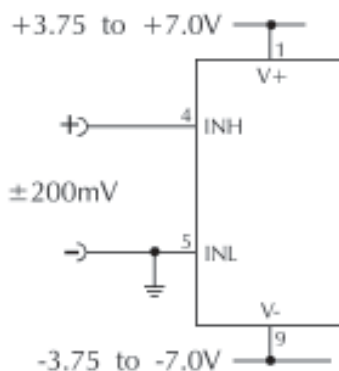
Ensure solder link LCOM is closed.



Measuring a current from a circuit which is floating with respect to the DPM's supply, i.e. the current and the meter's power supply are isolated from each other.

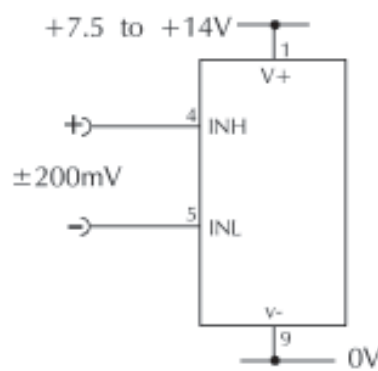
Ensure solder link LCOM is closed.

#### 7.5 to 14V Meter Power Supply



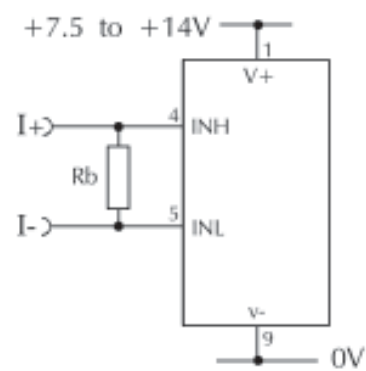
Measuring a single ended input voltage referenced to supply, i.e. the input voltage and the meter's power supply share the same 0V rail.

Ensure solder link LCOM is open.



Measuring an input voltage referenced to a floating supply, i.e. the input voltage and the meter's power supply are isolated from each other.

Ensure solder link LCOM is closed.



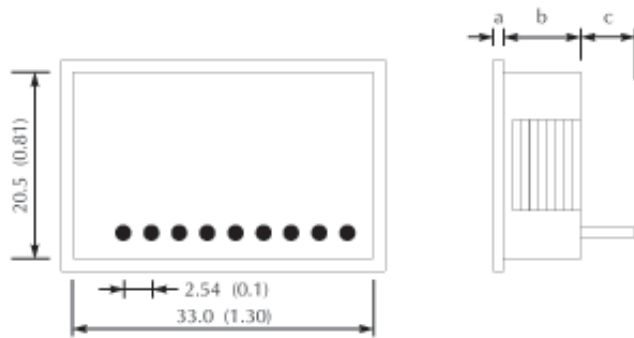
Measuring a current from a circuit which is floating with respect to the DPM's supply, i.e. the current and the meter's power supply are isolated from each other.

Ensure solder link LCOM is closed.



# EA 4035-400S

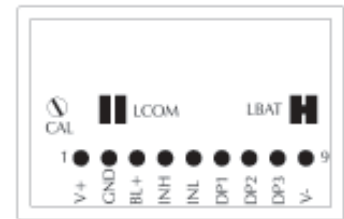
## DIMENSION



all Dimensions are in mm (inch)  
Panel Cutout 34x21,3 mm

a. 0.75 (0.03)  
b. 10.00 (0.39)  
c. 6.00 (0.24)

## PINOUT



Solder Links:

LCOM Normally Open. Connects INL to COM.  
LBAT Normally Closed. Cut this link to disable the lowbattery warning sign.

## PIN FUNCTION

PIN FUNCTION		
Pin	Symbol	Function
1	V+	Positive power supply to the meter.
2	GND	0V power supply connection to the meter.
3	BL+	Connect to V+ to switch on the LED backlighting (V+ to GND configuration only) Important note: For correct meter operation, the LED backlighting must not be enabled in 7.5 to 14V meter power supply configurations.
4	INH	Positive measuring input.
5	INL	Negative measuring input.
6	DP1	Connect to 0V to display DP1 (199.9).
7	DP2	Connect to 0V to display DP2 (19.99).
8	DP3	Connect to 0V to display DP3 (1.999).
9	V-	Negative power supply to the meter.



Note:

A negative supply is generated internally and mirrors the positive supply. For example: if V+ is +5V, then the internally generated V- is -5V. When measuring with the input referenced to the same supply rail as that of the panel meter, then the limitations on the input range are (V- +1.5V) to (V+ - 1.5V).

## ELECTRICAL SPECIFICATIONS

Specification	Min.	Typ.	Max.	Unit	
Accuracy (overall error) *		0.1		%(±1 count)	
Linearity			±1	count	
Sample rate		2.5		samples/sec	
Operating temperature range	0		50	°C	
Temperature stability		100		ppm/°C	
Supply voltage	V+ to GND configuration	3.5	5	7	V
	V+ to V- configuration	7.5	9	14	V
Supply current	V+ to GND configuration		350		µA
	V+ to V- configuration		350		µA
Backlight current @5V d.c.		40	80	mA	
Input leakage current (Vin = 0V)		1	10	pA	

## BLOCK DIAGRAM

