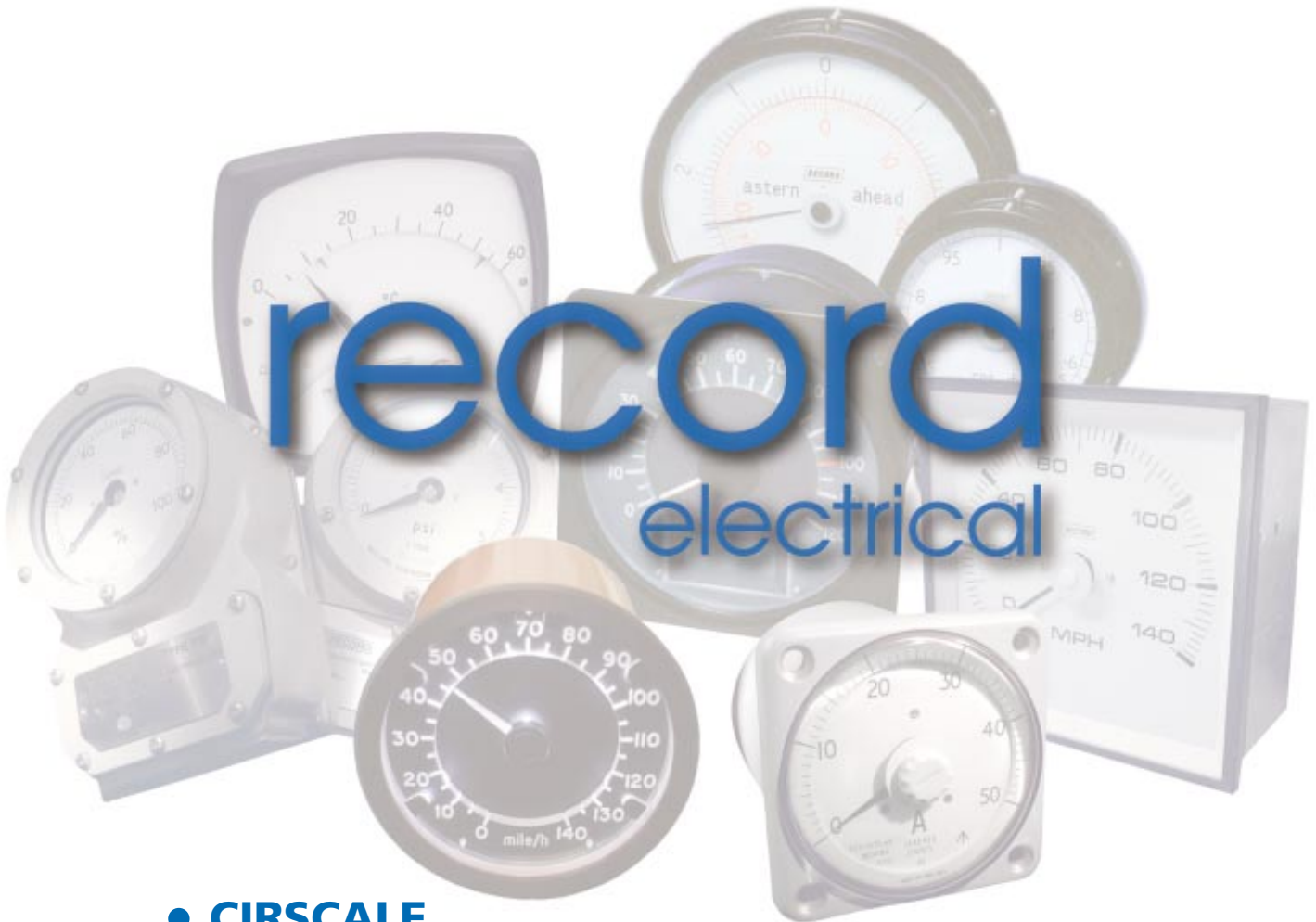


...a reputation for quality  
built on reliability and accuracy...



- **CIRSCALE**
- **CONTROL**
- **DIN**
- **FM4**
- **MARINE**
- **TRACTION**
- **PANEL**
- **ALTERNATORS / GENERATORS**
- **RECORDERS**

## CONTENTS LIST

- **Cirscale**
- **Control**
- **Din**
- **FM4**
- **Marine**
- **Traction**
- **Panel**
- **Alternators / Generators**
- **Recorders**

### About Us

Established 1911, Record Electrical is the a specialist supplier of Analogue Moving Coil and Moving Iron indicators with the "RECORD" and "CIRSCALE" trademark's known worldwide as a symbol of quality and accuracy

The indicators are manufactured and calibrated in our Altrincham factory under a quality system certified to BS EN ISO 9001: Selected indicators are certified for use in hazardous area applications holding SIRA/CENELEC certification for both intrinsically safe and Type N areas with IP66 rating, and panel mounting with IP54 rating.

State of the art technology is used in our latest instruments for inovative solutions to difficult applications, one example is the Speedometers being supplied to the new breed of trains indicates not only the actual speed of the train but also sends a duplicate signal to the "OnTrian Monitor"

### RTM Group Ltd - Metra Blansko

A recent venture by the RTM Group in conjunction with Metra Blansko, the Czech Republic instrument manufacturer, has been to market, promote and sell their range of inexpensive but never the less accurate Panel Meters, Switch Board Meters and Chart Recorders.

Record Electrical is a division of the RTM Group which has 3 other divisions:

**Arkon** - Flow measurement & control.  
[www.arkon.co.uk](http://www.arkon.co.uk)

**Townson & Mercer** - Specilised lab equipment.  
[www.townson-mercet.co.uk](http://www.townson-mercet.co.uk)

**Whitelegg** - Sheet metal fabrication.  
[www.whiteleggs.co.uk](http://www.whiteleggs.co.uk)



# RECORD Cirscale

## MOVING COIL INDICATORS



- Seven standard sizes.
- Accuracy to  $\pm 1\%$  (class 1).
- Long scale  $240^\circ$  Presentation.
- Dial markings to customer's requirements
- Strong construction.
- Certified for use within hazardous areas
- Robust "PREMIER" pivot & jewel moving coil movement



This family of circular panel meters/moving coil indicators has been designed for use in the most demanding of industrial applications.

Available in case sizes ranging from 50 mm to 300 mm diameter they are supplied with suitable fastenings for quick and easy assembly into panels.

The **Cirscale** range utilises the  $240^\circ$  "Premier" movement. This proven movement system has been manufactured using the very best precision components and automated production facility. These factors give the movement system its inherent reliability, linearity and accuracy among moving coil indicators.

Dials are marked to customers requirements and can include coloured indices/lines/bands, dual /multi scales and customer's name/logo, etc.

Instruments are available for A.C. or D.C. applications. For large A.C. or D.C. current

and voltage applications we could supply complete with external current/voltage transformers, shunts, or suitable transducers.

### OPTIONAL FEATURES

**Illuminated Scales:** The Cirscale range offers two types of illumination.

**Internal Illumination:** Long life filament lamps within the case illuminate the translucent dial. Illumination power either 12 V d.c. or 24 V d.c. as standard.

**External Illumination:** Slots in the case allow light to be shone into the acrylic dial,

illuminating the scale and pointer.

**Rear Zero Adjustment:** Available when front zero adjustment is not required, or if a plain glass front is required.

**Intrinsically Safe:** Certified by **SIRA** for use in ATEX category 3,2 & 1 respectively, gas group IIC. The technique of intrinsic safety is the highest integrity method of protection available.

**Manufactured to BS 89 under the control of ISO 9001 Quality System.**

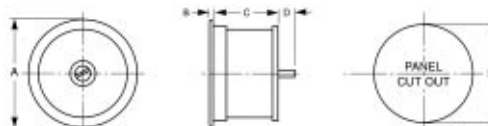
### Electrical Specifications

Type	D.C. Current		Full Scale Range For self-contained Instruments				A.C. Current		A.C. Volts		Intrinsic Safe EEx ia IIC T4, T5, T6	
	min	max	D.C. Volts		A.C. Current		min	max	min	max	mA 4/20	mA 0/10
2 PA	0.2mA	500mA	50mV	400V	-	-	-	-	-	-	-	-
2.75 PA	0.2mA	500mA	50mV	400V	-	-	-	-	-	-	-	-
3.25 PA	0.2mA	20A	50mV	400V	1mA	50mA	5V	600V	-	-	-	-
4 PA	0.2mA	20A	50mV	600V	1mA	20A	5V	600V	Yes	Yes	Yes	Yes
6 PA	0.2mA	20A	50mV	600V	1mA	20A	5V	600V	Yes	Yes	Yes	Yes
8 PA	1mA	20A	50mV	600V	1mA	20A	5V	600V	-	-	-	-
12 PA	1mA	20A	50mV	600V	1mA	20A	5V	600V	-	-	-	-

Accuracy to BS 89 D.C. Ranges  $\pm 1.0\%$  (Class 1) mV & A.C. Ranges  $\pm 1.5\%$  (Class 1.5)  
 For D.C. current ranges above those stated an external shunt should be supplied.  
 For A.C. current ranges above those stated a current transformer could be supplied.  
 Sealed to IP54 with front zero adj.

Intrinsically safe Ambient  
 Temp. Range: -20 deg. C to +40 deg. C  
 Sealed to IP66 without front zero adj.  
 Hazardous Area Indicators Only  
 Cert No. SIRA03ATEX2272X

### Mechanical Specifications & Dimensions



Type	Dimensions (units)							Options		
	A max (mm)	B max (mm)	C max (mm)	D max (mm)	E min (mm)	Scale Length (mm)	Weight (Approx) (Kgs)	Rear Zero	Dial Illumination Internal	External
2 PA	54	8	46	25	51	90	0.1	-	-	-
2.75 PA	70	7	39	16	67	100	0.2	-	-	-
3.25 PA	95	2.5	55	18	89	138	0.4	Yes	-	Yes
4 PA	120	2.5	71	51	114.5	173	0.6	Yes	Yes	Yes
6 PA	172	2.5	88	51	165	260	1.4	Yes	Yes	Yes
8 PA	217.5	3.5	94	10	203	375	2.5	Yes	Yes	-
12 PA	350	3.5	90	10	330	460	4.3	Yes	Yes	-

### Typical Scale Format

Style 1

(bold presentation for rapid reading)



Style 2

(this style supplied unless otherwise specified)



# RECORD Control

## MOVING COIL INDICATORS WITH CONTROL OPTIONS 311



- 2 standard sizes with long 240° presentation
- Switching indicator with 90° scale & visible set points.
- Combines indication with control.
- Simple adjustment of high & low set points.
- Robust pivot & jewel movements

The control moving coil indicators (35SA, 45SA) and the Control Switching Indicator (45SI) have traditionally been associated with the larger control panel installations. Utilising a distinctively styled black moulded bezel and housed within a strong case, the meter comes complete with a die cast clamping band for simple panel mounting.

### 35SA & 45SA CONTROL MOVING COIL INDICATORS

Available in two standard sizes these meters offer long scale presentation using the 240° 'Premier' movement.

### 45SI CONTROL SWITCHING INDICATOR

This meter combines both analogue indication and control facilities. The moving coil indicator gives an accurate indication of the measured signal and shows any directional trend. Two visible markers indicate high and low control set points. The associated control relays are mounted directly onto the rear of the instrument, with all terminations insulated by a moulded terminal cover. The switching indicator utilises a special movement design incorporating a vane which switches the relays as it passes through the opto-sensors.

Both movement systems have been manufactured using the very best precision components and automated production facility. These factors give the movement system its inherent reliability, linearity and accuracy.

Dials are marked to customer's requirements and can include coloured indices/lines/bands, dual/multi scales and customer's name/logo etc.



Instruments are available for A.C. or D.C. applications. For large A.C. or D.C. current and voltage applications we could supply complete with external current/voltage transformers, shunts, or suitable transducers.

**Manufactured to BS 89 under the control of ISO 9001 Quality System.**

### SWITCHING SPECIFICATION

#### Set Points

Available as high and/or low setting adjustable over the whole scale by screw adjusters set in the instrument window. High and low settings can be adjusted to within 0mm of one another. Stops are fitted to limit the amount of travel of the instrument pointer beyond the set point which would otherwise cancel the trip conditions.

#### Relays

These are mounted on the rear of the indicator and are protected by an insulating cover.

#### Rating

Each relay is provided with two sets of voltage free, changeover contacts rated at 250V 8A AC; 30V 5A DC resistive.

### Aux Supply

Selected from 12, 24, 48, 110, 220V DC; 24, 48, 110, 230V AC, Allowable variation: -20% to +10%.

### OPTIONS

#### Reverse Action

With the pointer clear of the set points, the relays are energised.

When a trip condition arises and a set point is reached, the slave relay becomes de-energised and the contacts then operate.

Any failure in the auxiliary supply whilst the pointer is clear of the set points would be apparent since the slave relays would be de-energised and the contacts then operate, as in trip conditions.

#### Hold On

Once trip conditions are reached, the slave relay contacts are continuously maintained until the system is reset, which is achieved by the interruption of the auxiliary supply, by means of customer's external switch. A refinement on two set point indicators is for one level to hold-on until released by the other.

### Electrical Specifications

Type	D.C. Current		Full Scale Range For self-contained Instruments				A.C. Volts	
	min	max	D.C. Volts		A.C. Current		min	max
35SA	0.2mA	20A	50mV	400V	1mA	50mA	5V	400V
45SA	0.2mA	20A	50mV	600V	1mA	20A	5V	600V
45SI	0.5mA	1A	50mV	600V	1mA	5A	5V	600V

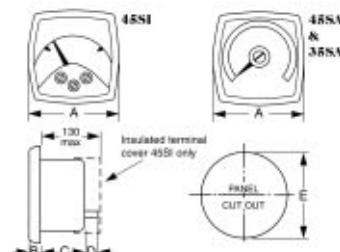
Accuracy to BS 89 D.C. Ranges  $\pm 1.0\%$  (Class 1) mV & A.C. Ranges  $\pm 1.5\%$  (Class 1.5)

For D.C. current ranges above those stated an external shunt should be supplied.

For A.C. current ranges above those stated a current transformer could be supplied.

### Mechanical Specs & Dimensions

Type	Dimensions (units)						Scale Length	Weight (Approx) (Kgs)
	A max (mm)	B max (mm)	C max (mm)	D max (mm)	E min (mm)			
35SA	92	13	39	19	69	150	0.3	
45SA	127	17	90	15	108	216	0.8	
45SI	127	17	87	35	108	105	0.9	



# RECORD Din

## MOVING COIL INDICATORS



- Five standard sizes.
- Accuracy to  $\pm 1\%$  (class 1).
- Long scale 240° presentation.
- Edgewise horizontal or vertical
- Dial markings to customer's requirements
- Strong construction.
- Robust "PREMIER" and "CLASSIC" pivot & jewel movements
- Conformance with DIN 43700

The Din concept was developed to standardise the range of instruments used in production of switchboards and control panels.

Because of **RECORD's** ability to respond to the special requirements of our customers the **RECORD** Din has been utilised in many other industrial applications including marine, production machinery, motor control systems and mosaic panels.

The Din long scale range utilises the 240° 'Premier' movement, and the edgewise utilises the 90° 'Classic' movement. These proven movement systems have been manufactured using the very best precision components and automated production facility. These factors give the movement system its inherent reliability, linearity and accuracy among Moving Coil Indicators.

Dials are marked to customer's requirements and can include coloured indices/lines/



bands, dual/multi scales and customer's name/logo etc.

Instruments are available for A.C. or D.C. applications. Electrical termination utilises screw fixings. Panel fixing is via simple screw clamps.

### Optional Features

**Internal Illumination:** Long life filament lamps within the case illuminate the translucent dial. Illumination power either 12V D.C. or 24V D.C. as standard.

### Full Scale Adjustment

An internally mounted potentiometer, accessible from the rear of the meter, allows the full scale to be up to  $\pm 20\%$

### Additional Accessories

To complete the control package **RECORD** can also supply current/voltage transformers, shunts or suitable transducers.

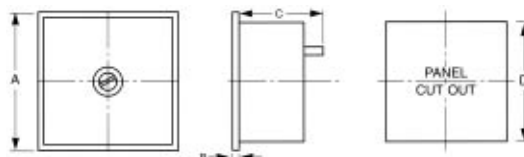
**Manufactured to BS89/DIN 43700 under the control of the ISO 9001 Quality System.**

### Electrical Specifications

Type	D.C. Current		Full Scale Range For self-contained Instruments				A.C. Current		A.C. Volts	
	min	max	D.C. Volts		A.C. Current		min	max	min	max
48DA	0.2mA	500mA	50mV	400V	-	-	-	-	-	-
72DA	0.2mA	20A	50mV	600V	1mA	500mA	5V	600V	5V	600V
96DA	0.2mA	20A	50mV	600V	1mA	20A	5V	600V	5V	600V
144DA	0.2mA	20A	50mV	600V	1mA	20A	5V	600V	5V	600V
144C	0.2mA	20A	50mV	600V	1mA	20A	5V	600V	5V	600V

Accuracy to BS 89 D.C. Ranges  $\pm 1.0\%$  (Class 1) mV & A.C. Ranges  $\pm 1.5\%$  (Class 1.5)  
 For D.C. current ranges above those stated an external shunt could be supplied.  
 For A.C. current ranges above those stated a current transformer could be supplied.

### Mechanical Specs & Dimensions



Type	Dimensions (units)					Options			
	A (mm)	B max (mm)	C max (mm)	D min (mm)	Scale Length* (mm)	Weight (Approx) (Kgs)	Pot Adjuster	Internal Illumination	
48DA	48SQ	5	66	45.5SQ	90	0.2	-	-	
72DA	72SQ	5	60	68.5SQ	120	0.3	Yes	-	
96DA	96SQ	5	69	92.5SQ	165	0.4	Yes	Yes	
144DA	144SQ	7	70	138SQ	245	0.75	Yes	Yes	
144C	114 x 48	9	192	138 x 45	125	0.5	-	-	

\*Scale length for long scale indicator is over 240°.  
 \*Scale length for edgewise indicator (144C) is over 48°

Sealed to IP 54 with front zero adjuster on square range  
 Operating temperature range -25 Deg. C to +50 Deg. C

# RECORD Field Mount

## MOVING COIL INDICATORS

### FOR HAZARDOUS AREAS



#### BENEFITS

- Holds both Intrinsically Safe and nL Type certification.
- Easy to read analogue indication gives at a glance a steady reading of level and rate of change.
- Simple to install with maintenance free weatherproof case.
- Individually calibrated and scaled to customers requirements.

#### APPLICATIONS

- Suitable for both safe and hazardous area applications.
- Petrochemical process plants, offshore oil and gas platforms, water treatment sites.
- Monitoring flow, level, volume, pressure temperature, etc.

#### FEATURES

- Strong epoxy-coated die-cast case sealed to IP66 with 5mm toughened glass window.
- Many fixing methods including pipe, wall or panel fixing.
- Stainless steel tag plate marked with your unique serial number.



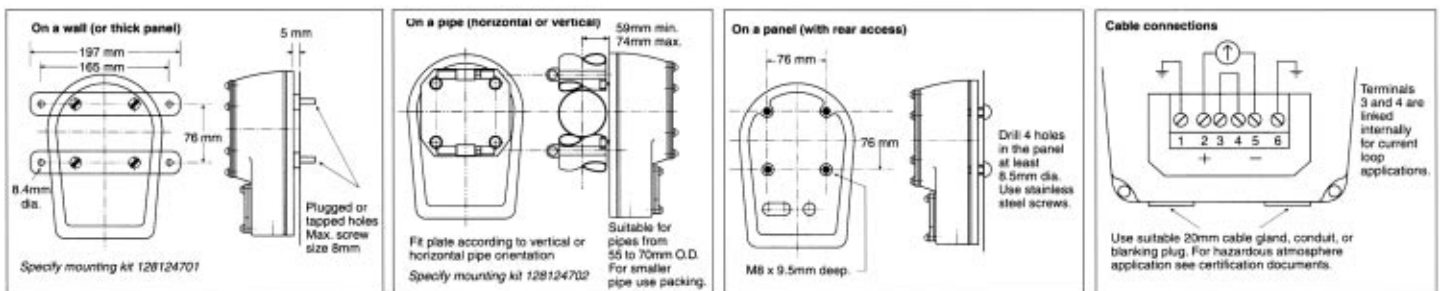
Known as the **FM4** this field-mounted indicator is rugged, weather proof in design and tested to withstand severe climatic and operating conditions such as those found on offshore oil and gas installations or exposed process plants.

The **FM4** utilises the 240° "Premier" movement. This proven movement system is manufactured

using the very best precision components and automated production facility. These factors give the movement system its inherent reliability, linearity and accuracy.

**The FM4 is manufactured to the most rigorous standards - in line with SIRA Certification & ISO 9001 and ATEX Quality requirements.**

#### Mounting & Connection Details



#### Specifications & Construction

Popular Ranges mA dc	Terminal Resistance (nominal) ohms
4 /20	4
0/10	4,5
Supply	None Required
Accuracy	± 1% at 20°C (To BS 89:Part 1:1990, EN 60051-1:1989)
Ambient Temp. Limits	-25°C to +70°C
Case	Epoxy-Coated Die Cast LM6 Alloy
Window	5mm Toughened Glass
Gaskets	Hypalon
Sealing	IP66 (Protected Against Ingress or Dust and Powerful Jets or Water)
Movement	Shock & Vibration Resistant Pivot and Jewel suspension
Dial	100 mm Flat Metal Dial, Colour White
Weight	2.1 Kg (Excluding Fittings)
Dimensions	See Diagrams

#### Hazardous Atmosphere

Certified Ranges mA dc	Movement Resistance min ohms	Max Inductance uH
4/20	4	195
0/10	4,6	200
<b>Intrinsically Safe Certification ia</b>		
Cert No:		SIRA 03 ATEX2270
Certification Codes		EEx ia IIC T6 Wmax in = 0.5W lmax in = 660mA
		EEx ia IIC T5 Wmax in = 0.7W lmax in = 660mA
		EEx ia IIC T4 Wmax in = 1.1W lmax in = 660mA
<b>Energy Limitation Certification nL</b>		
Cert No		SIRA 03 ATEX4271
Certification Code		EEx nL IIC T6 In = 60mA Un = 1v EN50021: 1999

Ambient Temperature Limits: -20 °C to +40 °C

# RECORD Marine

## HERMETICALLY SEALED MOVING COIL INDICATORS



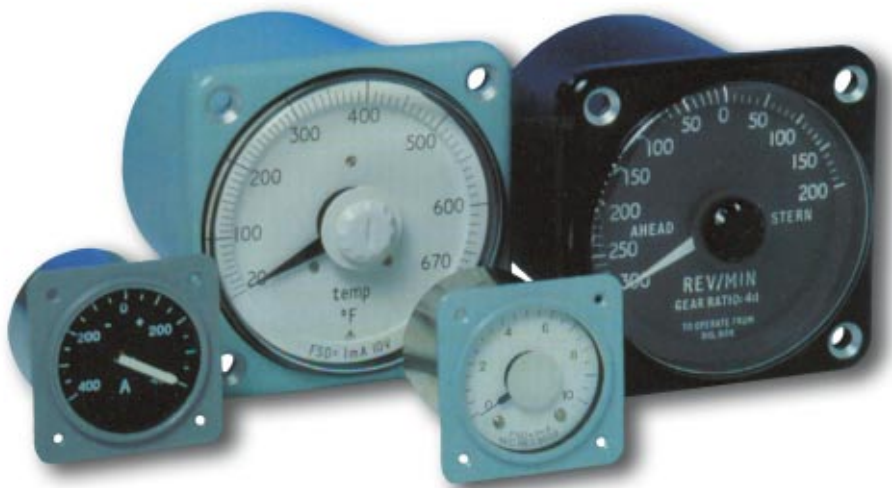
- 2 standard sizes, to DEF 66-7
- Accuracy to  $\pm 1\%$  (class 1).
- Long scale 240° Presentation.
- Dial markings to customer's requirements
- Hermetically sealed case.
- Robust "PREMIER" pivot & jewel movement
- Suitable for military and commercial applications.

available to DEF STAN 66-7

The **Marine** hermetically sealed range of panel meters has been designed to comply with the most stringent of marine and military applications, and has been engineered to withstand severe operating conditions. Because of this high specification they have often been used in other industrial areas where the robust sealed case design protects the movement system from harsh environmental factors.

The two standard sizes include the 4AH indicator which has a front zero adjuster, a moulded glass window and platform dial to reduce parallax error. The 2AH indicator has a non-reflective toughened glass window with a flat dial and knife pointer to improve scale readability.

The **Marine** hermetically sealed range utilises the 240° 'Premier' movement. This proven movement system has been manufactured using the very best precision components and automated production facility. These factors give the movement system its inherent reliability, linearity and accuracy.



Dials are marked to customer's requirements and can include coloured indices/lines/bands, dual multi scales and customer's name/logo etc.

Instruments are available for A.C. or D.C. applications. For large A.C. or D.C. current and voltage applications we could supply complete with external current/voltage transformers, shunts or suitable transducers.

### OPTION FEATURES

The 4AH meter can be illuminated internally. Long life filament lamps within the case illuminate

a translucent dial. Because the case is sealed two spare lamp sets are also fitted and can be utilised if one set fails.

The 2AH meter can be fitted with a 2 part dial and bold pointer to enhance the appearance and maintain readability. A rear zero adjuster can also be supplied.

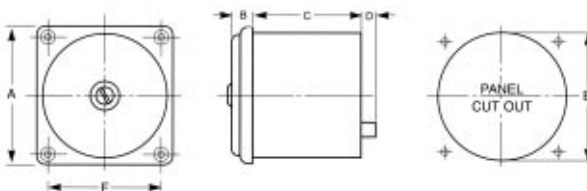
**Manufactured to BS89/DEF STAN 66-7 under the control of the ISO9001 Quality System.**

### Electrical Specifications

Type	D.C. Current		Full Scale Range For self-contained Instruments				A.C. Current		A.C. Volts	
	min	max	D.C. Volts		min	max	min	max	min	max
2AH	0.2mA	500mA	50mV	400V	-	-	-	-	-	-
4AH	0.2mA	20A	50mV	600V	1mA	20A	5V	600V		

Accuracy to BS 89 D.C. Ranges  $\pm 1.0\%$  (Class 1) mV & A.C. Ranges  $\pm 1.5\%$  (Class 1.5)  
For D.C. current ranges above those stated an external shunt could be supplied.  
For A.C. current ranges above those stated a current transformer could be supplied.

### Mechanical Specs & Dimensions



Type	Dimensions (units)					Scale Length (mm)	Weight (Approx) (Kgs)	Rear Zero	Options	
	A max (mm)	B max (mm)	C max (mm)	D max (mm)	E min (mm)				Dial Illumination Internal	External
2AH	60SQ	4	44	22	53	45	3	M3c'sk	85	0.3
4AH	110SQ	18	88	30	103	85.7	7.8	M6 c'sk	170	0.9

Standard Terminations

- 2AH M5 Stud with Solder Tag
- 4AH M5 Screw Fixing

Case Hermetically Sealed  
Standard Industrial Seal

- DEF 66-7 (Part 1), IP67
- IP 54

Finish Bezel Area

- Semi Gloss Light Grey or Black
- Operating Temp. range: - -40 °C to +70 °C
- Storage Temp. range: - -50 °C to +85 °C

# RECORD Traction

## SPEED INDICATORS



- Three standard sizes.
- Accuracy to  $\pm 1.5\%$  (class 1.5).
- Long scale 240° Presentation.
- Dial marking to customer requirements.
- Strong construction.
- Toughened glass window.
- Robust pivot & jewel movement.
- Illuminated scales.



The **Traction** range of speed indicating instruments has been designed to meet the requirements of transit units worldwide.

In the operational areas of passenger transport & industrial rail freight great demands are placed on instrumentation systems due to the severe shock and vibration that can be experienced during service.

In many of these applications RECORD Traction Speed instruments are chosen because of their robust design and reliability.

Many of the world's railways are now run by operating companies with long-term franchises. Trains themselves usually last between 30 and 40 years and because of these factors operators and manufacturers look for long term reliability and availability to support the working life of the transit system.

The Twinset internal movement pointer indicates the actual track speed of the vehicle, and the outer pointer controlled by additional equipment shows the max allowable track speed for the particular line.

As interiors of the passenger compartments change to meet requirements of fashion and passenger safety. The driver's cabin has become more spacious and designed with driver comfort in mind.

One item, the speed indicator, has remained relatively unchanged. This is due to the need to maintain familiarity between drivers around the world and the engineering acceptance that this product has gained over many years.

### OPTIONAL FEATURES

The 4TA & 6TA instruments can be supplied with digital displays to indicate variables such as hours run. Servo motors can be utilised to give additional indication.

The Traction range utilises the 240° "Premier" movement system. This proven system has been manufactured using the very best precision components and automated production facility. These factors give the movement its inherent reliability, linearity and accuracy.

### THERE ARE 3 STANDARD SIZES AVAILABLE

3.25TA, 4TA & 6TA. All instruments have square bezels with 4 point corner fixing. This allows easy front mounting. A slotted cover allows

light to illuminate the dial and pointer. The scale is engraved into the acrylic dial and protected by a toughened glass window. Instruments are fitted with a rear zero adjuster and are designed to operate from either A.C. or D.C. signals with accuracy to  $\pm 1.5\%$ .

### OPTIONAL FEATURES

**Internal Illumination:** Longlife filament lamps or LED's can be fitted into the rear of the case to illuminate a translucent dial. Illumination power with 12V d.c. or 24V d.c. as standard.

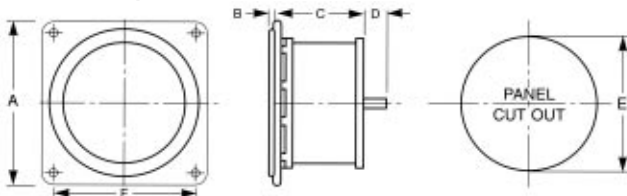
**Round Bezel:** Instrument can be fitted with round bezel and rear clamp fixing.

Mechanical Specs & Dimensions non-reflective glass window

**Special Features:** Contact RECORD Sales and discuss your special requirements. Existing optional features have been developed from our customer's needs

**Manufactured to BS 89/BR563 under the control of the ISO 9001 Quality System.**

### Mechanical Specs & Dimensions



Type	Dimensions (units)								
	A max (mm)	B max (mm)	C max (mm)	D max (mm)	E min (mm)	F Fixing holes (mm)		Scale Length (mm)	Weight (Approx) (Kgs)
3.25TA	100	5	54	10	92	SQ	DIA	140	0.5
4TA	128	5	67	-	114	81	7	140	0.75
6TA	175	5	86	-	163	103	7	190	1.4
TWINSET	175	5	86	18	163	142	6.2	190	1.6

Sealed to IP 54 with rear zero adjuster.  
Finish - Semi gloss black  
Operating temperature range - 25 °C to +50 °C



# RECORD Panel Meters

## MOVING COIL INDICATORS



- Six Standard Sizes
- Accuracy to  $\pm 2,5\%$
- Short Scale Presentation
- Dial Marking to Customer Requirements
- Optional Illumination
- A.C. or D.C. Inputs Available

### OVERVIEW

This family of inexpensive, rectangular and square fronted panel meters have been designed for use in various industrial applications.

The MP 40, 80 & 120 meters have a square front bezel presentation. The MP 210, 220 & 230 indicators have a rectangular front bezel appearance.

All meters use a moving coil movement with knife edge pointer and white dial.

Dials are marked to the customers requirements and can include coloured indices /lines/bands, dual/multi-scales and customers name/logo etc.

Instruments are available for A.C. or D.C. applications. For large A.C. or D.C. current and voltage applications we can supply complete with external/voltage transformers, shunts, or suitable transducer.

### OPTIONAL FEATURES

An optional illumination feature for the MP80 and 120 meters is available at an additional cost.



### Technical data

type	accuracy class	pointer deflection	dimensions (mm)	weight (approx.)
MP, MuP, MiP 40	2,5	90	40 x 40 x 35	0.035 kg
MP, MuP, MiP, MkP 80, MP 80-0	1,5	80	80 x 80 x 53	0,2 kg
MP, MuP, MiP, MkP 120, MP 120-0	1,5	80	120 x 120 x 60	0,3 kg
MP, MuP 210, MP 210-0	2,5	95	53 x 43,5 x 44	0,05 kg
MP, MuP 220, MP 220-0	1,5	100	77,5 x 60,5 x 52,5	0.08 kg
MP, MuP 230, MP 230-0	1,5	100	102,5 x 76,5 x 52,5	0.11 kg
MP, MuP220-T, MP 220-T0	1,5	100	102,5 x 76,5 x 56,5	0,14 kg

### Panel Instruments

type	range
MP 40	60 $\mu$ A $\div$ 4A, xA/60mV DC 10mV $\div$ 600V DC
MuP 40	150 $\mu$ A $\div$ 40A AC 2,5V $\div$ 250V AC
MiP 40	150mA $\div$ 1A AC
MP 80, 120	10 $\mu$ A $\div$ 60A, xA/60mV, xA/150mV DC 10mV $\div$ 600V, xkV/10V DC +20°C $\div$ +1600°C
MP 800, 1200	$\pm$ 100 $\mu$ A $\div$ $\pm$ 60A, $\pm$ xA/60mV, $\pm$ xA/150mV DC $\pm$ 60mV $\div$ $\pm$ 600V DC
MuP 80, 120	100 $\mu$ A $\div$ 400mA AC 2,5V $\div$ 600V AC 400n/min $\div$ 10000n/min
MiP 80, 120	10mA $\div$ 10A AC
MkP 80, 120	-200°C $\div$ +550°C 16 $\Omega$ , 100 $\Omega$
MP 210	60 $\mu$ A $\div$ 6A, xA/60mV DC 40mV $\div$ 600V DC
MP 210-0	$\pm$ 60 $\mu$ A $\div$ $\pm$ 6A DC $\pm$ 40mV $\div$ $\pm$ 600V DC
MuP 210	100 $\mu$ A $\div$ 60A, xA/1A, xA/5A AC 6V $\div$ 600V AC
MP 220, 230	40 $\mu$ A $\div$ 6A, xA/60mV DC 15mV $\div$ 600V, xkV/10V DC +20°C $\div$ +2500°C
MP 220-0, 230-0	$\pm$ 40 $\mu$ A $\div$ $\pm$ 6A, $\pm$ xA/60mV DC $\pm$ 25mV $\div$ $\pm$ 600V, $\pm$ xkV/10V DC
MuP 220, 230	100 $\mu$ A $\div$ 60A, xA/1A, xA/5A, AC 6V $\div$ 600V, xkV/100V AC 400n/min $\div$ 10000n/min
MP 220-T, 230-T	40 $\mu$ A $\div$ 60A, xA/60mV DC 15mV $\div$ 600V, xkV/10V DC +20°C $\div$ +2500°C
MP 220-T0, 230-T0	$\pm$ 40 $\mu$ A $\div$ $\pm$ 60A, $\pm$ xA/60mV DC $\pm$ 25mV $\div$ $\pm$ 600V, $\pm$ xkV/10V DC
MuP 220-T, 230-T	100 $\mu$ A $\div$ 60A, xA/1A, xA/5A AC 6V $\div$ 600V, xkV/100V AC 400n/min $\div$ 10000n/min

# RECORD Generators & Alternators



## AC TRANSMITTERS

MANUFACTURED TO MOD STANDARDS

### APPLICATIONS

- Suitable for wide variety of rotary linear speed measurement/control
- Industrial Process System
- Diesel Engines

### CONSTRUCTION

- Cast Aluminium Housing as Standard
- Gunmetal alternative for hazardous environments

### DRIVING TORQUE

600 grm cm for single phase  
150 grm cm for three phase

### OUTPUT OPTIONS

OUTPUT	MAX LOAD
AC 1v/100 rpm	60 mA
AC 5v/100 rpm	10 mA
AC 0,5v/100 rpm	20 mA
DC 2,5v/100 rpm	4 mA

(Three phase rectified)

Multiple receivers can be used with each transmitter

### OPERATING SPEED LIMIT

1v/100 and 5v/100rpm	800 - 8000 rpm
0,5v/100 rpm	800 - 7500 rpm
2,5v/100 rpm (Rectified)	275 - 3000 rpm

### GEARBOX RATIOS

HD 1: 5-22, 1: 10-2  
LD 1: 2, 1:4, 1:6



## DC TRANSMITTERS

MANUFACTURED TO MOD STANDARDS

A tachometer Transmitter (Tachogenerator) connected to a Receiver (Tacho Indicator)

Makes a Tachometer System for the measurement, monitoring and control of speed.

„Record“ style permanent magnet self exciting transmitters are AC or DC generators which, when mechanically driven, produce an out put value proportional to speed.

### ACCURACY

Combined accuracy is 15% of full scale indication tested at 20°C+5°C. For temperature range 0 - 35 °C the above accuracy, is doubled.

### APPLICATIONS

- Heavy Duty Marine/Offshore/ Steel works
- Bi-directional forward/reverse controls

### CONSTRUCTION

- Heavy duty cast Aluminium housing
- Impregnated for water-tight models
- Parallel or tapered Shaft available
- WT (Admiralty pattern) able to withstand water immersion to a depth of 4,5m
- WT Base Mounted to depth of 1m

### OUTPUT OPTIONS

DC 5v/100 rpm  
DC 10v/100 rpm

All models have limiting resistance located in the terminal box. By selecting the appropriate resistance value, up to 5 receivers may be operated from each generator (5v/100 rpm output only).

NUMBER OF RECEIVERS CONNECTED	1	2	3	4	5
VALUE OF LIMITING RESISTANCE $\Omega$	1840	880	560	400	305

### OPERATING SPEED LIMITS

200 - 5000 rpm direct drive  
200 - 2000 rpm for non direct drives



# RECORD Recorders

## PANEL LINE RECORDER ZR 440



### OUR PANEL LINE CHART RECORDERS

the new design complies with the safety standards EN in the safety, EMC and operation.

- Alarm for max and min on all channels
- galvanic separation of inputs
- improved dynamic characteristics (frequency response)
- various values of input and supply voltage
- compatibility with transducers

### BASIC OPTION:

ZR 441 Chart Recorder - single channel with fibre pen

ZR 442 Chart Recorder - two channel with fibre pens

ZR 443 Chart Recorder - three channels with fibre pens

The line recording instrument ZR 440 uses the compensation principle based on the linear motor and position resistivity sensor. The instrument is designed to be easily built into a panel. On the rear pannel there are contacts for connection of input signals.



### USER'S OPTION:

- number of channels: 1, 2, 3
- recording chart: rolls or folded paper
- power supply: 24 - 230 V DC or 6 voltages AC
- input signal parameters: DC, AC
- standard scale division: 0...100
- line colour: blue, red, green

### TECHNICAL PARAMETERS

**Operating condition:** EN 61 143-1

**Accuracy:** 1%

**Measured input signals:**

### Technical parameters

with galvanic channel separation - DC	1 mA; 2,5 mA; 5 mA; 10 mA; 20 mA; 4...20 mA; 25 mA; 50 mA; 100 mA; 250 mA; 500 mA; 1 A 60 mV; 150 mV; 300 mV; 500 mV; 1 V; 2,5 V; 10 V; 25 V; 50 V; 100 V; 400 V; 500 V ± 1 mA; ± 2,5 mA; ± 5 mA; ± 10 mA; ± 20 mA; ± 25 mA; ± 50 mA; ± 100 mA; ± 250 mA; ± 500 mA; ± 1 A; ± 60 mV; ± 150 mV; ± 300 mV; ± 500 mV; ± 1 V; ± 2,5 V; ± 5 V; ± 10 V; ± 25 V; ± 50 V; ± 100 V; ± 250 V; ± 500 V;
with galvanic channel separation - AC	100 mA; 250 mA; 500 mA; 1 A; 2,5 A; 5 A 50 V; 57,7 V; 100 V; 120 V; 230 V; 250 V; 500 V
Temperature measurement	sensor PT 100 - without galvanic channel separation (three-wire connection on terminals x3, x4, x5, where x indicates the number of channel, limit device is limited by the number of terminals) -70...130 °C, -50...50 °C, 0...100 °C, 0...150 °C, 0...200 °C, 0...400 °C, 0...600 °C
Recording chart	refillable fibre pen, line lenght min. 1000 m pro one filling, max. chart speed 0,1 m/sec
Width of recording	100 mm
Response time	adjustable from 0,25 to 10 sec
Frequency response	2 Hz
Non-sensitivity	0,5 %
Time quartz-unit	crystal controlled
Paper feed rate	1, 2, 5, 10, 20, 60, 120, 240, 300, 600, 1500, 3000 mm/h ± 0,2 %
Feed control	by means of code switches inside the instruments - by remote control
Power supply	
DC	24, 48, 60, 110 V ± 20 % DC
AC	120, 230 V ± 15 % AC (45-66 Hz)
The line recorder complies with safety standard EN 61010-1	
Protection class	I
Overvoltage category	III
Pollution degree	2
Climate resistance category	WT according to IEC 721-2-1
Electromagnetic compatibility	according to EN 50081-1 EN 50082-1
Dimensions	
front	144x144 mm, opening downwards (option to the left)
total lenght	max. 293 mm
total lenght with fixed convertors NCR	max. 330 mm
Weight	max.5 kg

# Accessories / Consumables



## CONSUMABLES FOR ALL RECORDERS

- charts
- pens



## ACCESSORIES FOR INDICATORS

- current transformer - on request
- shunts - on request
- transducers - on request



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