MFA 4P

Milltronics MFA 4P

Operating Instructions · 04/2014

Milltronics

SIEMENS

Safety Guidelines: Warning notices must be observed to ensure personal safety as well as that of others, and to protect the product and the connected equipment. These warning notices are accompanied by a clarification of the level of caution to be observed.

Qualified Personnel: This device/system may only be set up and operated in conjunction with this manual. Qualified personnel are only authorized to install and operate this equipment in accordance with established safety practices and standards.

Unit Repair and Excluded Liability:

- The user is responsible for all changes and repairs made to the device by the user or the user's agent.
- All new components are to be provided by Siemens Milltronics Process Instruments.
- Restrict repair to faulty components only.
- Do not reuse faulty components.

Warning: Cardboard shipping package provides limited humidity and moisture protection. This product can only function properly and safely if it is correctly transported, stored, installed, set up, operated, and maintained.
This product is intended for use in industrial areas. Operation of this equipment in a residential area may cause interference to several frequency based communications.

Note: Always use product in accordance with specifications.

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Industry Sector
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- For a selection of Siemens Milltronics level measurement manuals, go to: **www. siemens.com/processautomation**. Under Process Instrumentation, select *Level Measurement* and then go to the manual archive listed under the product family.
- For a selection of Siemens Milltronics weighing manuals, go to: **www. siemens.com/processautomation**. Under Weighing Technology, select *Continuous Weighing Systems* and then go to the manual archive listed under the product family.

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Pulses generated from the probe are continually compared to the adjustable setpoint. If the pulse rate is lower than the setpoint, the alarm relays operating in a fail-safe mode will de-energize, indicating failure. The relays will not energize until the pulse rate increases above the setpoint.

Safety Notes

Special attention must be paid to warnings and notes highlighted from the rest of the text by grey boxes.

! **WARNING means that failure to observe the necessary precautions can result in death, serious injury, and/or considerable material damage.**

Note: means important information about the product or that part of the operating manual.

The Manual

This instruction manual covers the installation, operation and maintenance of the Milltronics MFA 4p. It is essential that this manual be referred to for proper installation and operation of your unit. Adhering to the installation and operating procedures will insure a quick, trouble free installation and allow for the maximum accuracy and reliability of your motion sensing alarm unit and probes.

If you have any questions, comments, or suggestions about the manual contents, please email us at techpubs.smpi@siemens.com.

For the complete library of Siemens Milltronics manuals,

go to www.siemens.com/processautomation.

Specifications

Safety

Note: The Milltronics MFA 4p (Motion Failure Alarm) is to be used only in the manner outlined in this manual, otherwise protection provided by the equipment may be impaired.

Power

- 100/115/200/ 230 V AC ±15%, 50/60 Hz, 15 VA

Output

- 2 relays with Form C (S.P.D.T.) fail-safe contacts (relays operate in unison)

Resistive Rating:

- 8 A @ 250 V AC

Repeatability

- ± 1%

Temperature coefficient (setpoint variance)

- 0.018%/ °C (0.01% / °F)

Setpoint adjustment range

- 2 to 3,000 ppm (pulses per minute): standard model
- 0.15 to 15 ppm: slow speed version

Dynamic range

- 0 to 7,200 ppm

Weight

- polycarbonate enclosure: 1.5 kg (3.3 lb.)
- mild steel or stainless steel enclosure: 4.3 kg (9.5 lbs.)

Approvals[1]

- CE, $CSA_{(C/US)}$, FM
- EMC performance available on request

Environmental

- location: Indoor/outdoor
- altitude: 2000 m max.
- ambient temperature: –20 °C to 50 °C (–4 °F to 122 °F)
- relative humidity: suitable for outdoor (Type 4X / NEMA 4X / IP65)*
- installation category: II
- pollution degree: 4

*Type 4/ NEMA 4 /IP65 with mild steel enclosure

Related Equipment	Ambient Temperature Range	Approx wt.
RMA	–40 °C to 60 °C (–40 °F to 140 °F)	2.3 kg (5 lb)
MSP-12	–40 °C to 60 °C (–40 °F to 140 °F)	1.4 kg (3 lb)
XPP-5	–40 °C to 60 °C (–40 °F to 140 °F)	1.8 kg (4 lb)
MSP-3	–40 °C to 260 °C (–40 °F to 500 °F)	1.4 kg (3 lb)
MSP-9	–40 °C to 260 °C (–40 °F to 500 °F)	1.8 kg (4 lb)

1. EMC performance available upon request.

Installation

Milltronics MFA 4p

The MFA 4p (and RMA if applicable) must be mounted in a non-hazardous area that is clean, dry, vibration-free, within the ambient temperature range, and non-corrosive to the electronics or its enclosure. The door should be accessible for viewing and to allow calibration of the MFA 4p.

Note: Do not mount MFA 4p in direct sunlight.

Probe

The probe should be mounted onto a vibration free structure using the mounting flange. The gap between probe and target should be large enough to prevent the target from damaging the probe. The probe environment must be within the probe's ambient temperature range and non-corrosive to the probe's body. Refer to Applications drawings on page 23.

The probe design detects a changing magnetic field, typically caused by a ferromagnetic target disturbing the probe's magnetic field. Extremely strong magnetic fields (like those produced by the 30A/m requirements of 1EC 60004-8, Power Frequency Magnetic Field Immunity test) will be detected and will result in loss of functionality.

Functionality loss indicators:

- alarm conditions by relay trip
- false pulse readings in LED1

Consider the probe location carefully before installation. Avoid strong magnetic fields (50/60 Hz) from nearby power transformers, heater elements, or large industrial motors, because these can affect the probe’s performance.

Wiring

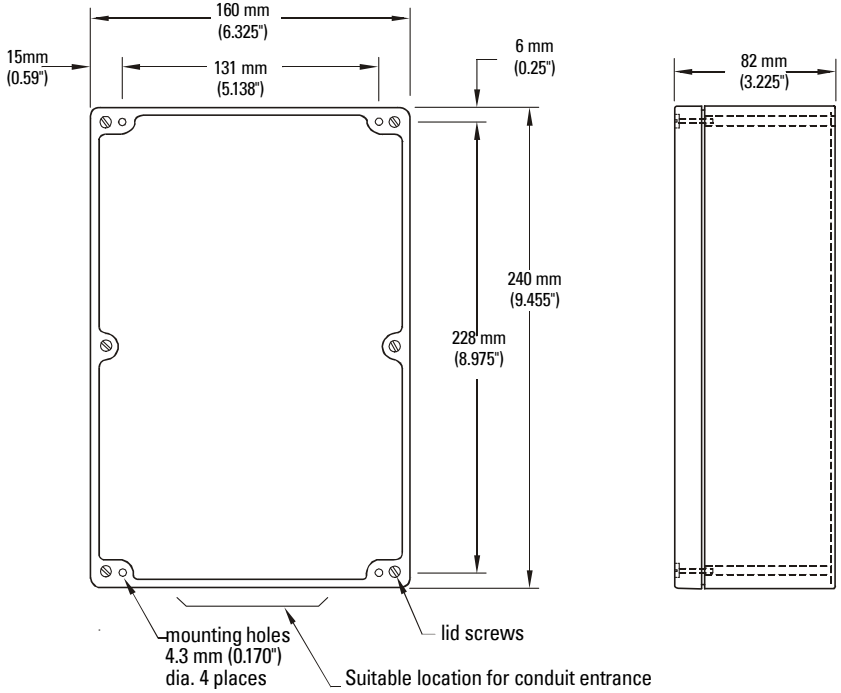
Where possible, the probe components should be interconnected via flexible conduit. This allows for easier removal or adjustment of the probe and mounting flange assembly.

Note: Installation shall only be performed by qualified personnel and in accordance with local governing regulations.

Dimensions

MFA 4p

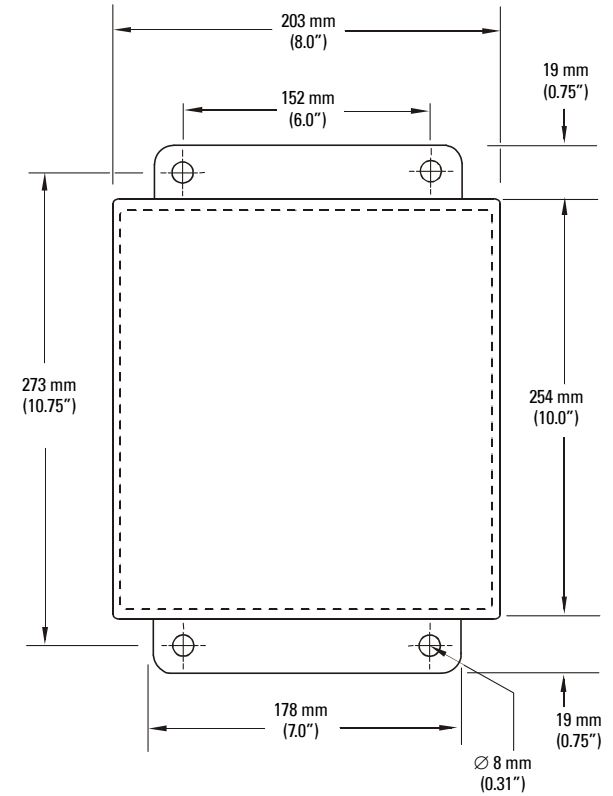
Type 4X / NEMA 4X / IP65 Polycarbonate Enclosure

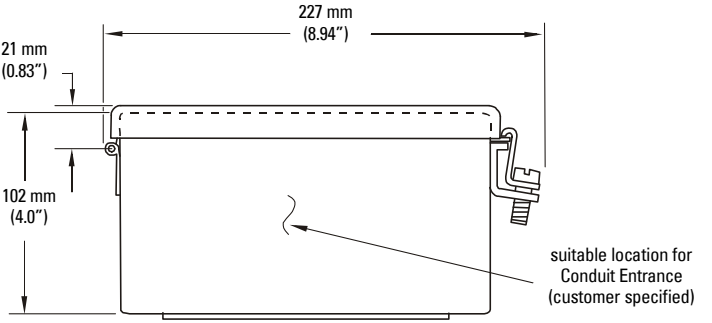


Notes:

- Non-metallic enclosure does not provide grounding between conduit connections: use grounding type bushings and jumpers.
- Use only approved, suitable size hubs for watertight application.

Type 4 / NEMA 4 / IP65 Painted Steel Enclosure & Type 4X / NEMA 4X / IP65 Stainless Steel Enclosure



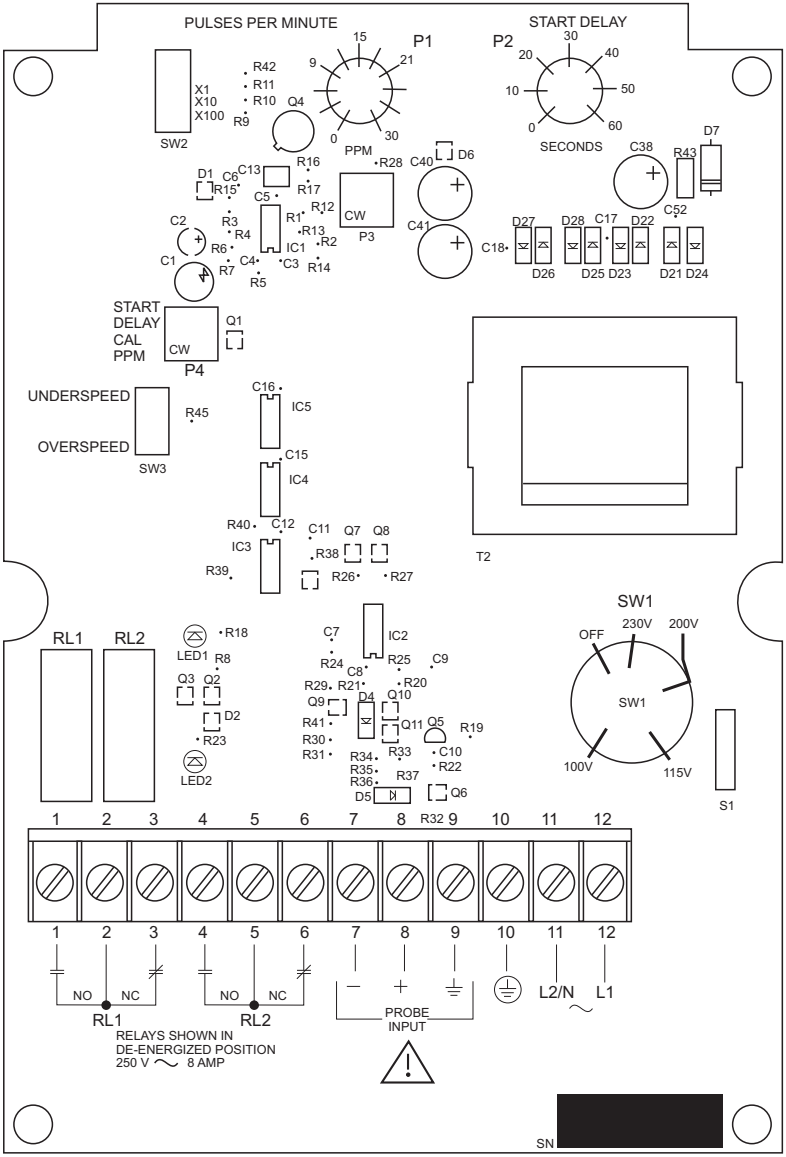


Notes:

- Painted steel enclosure does not provide grounding between conduit connections: use grounding type bushings and jumpers.
- Use only approved, suitable size hubs for watertight application.

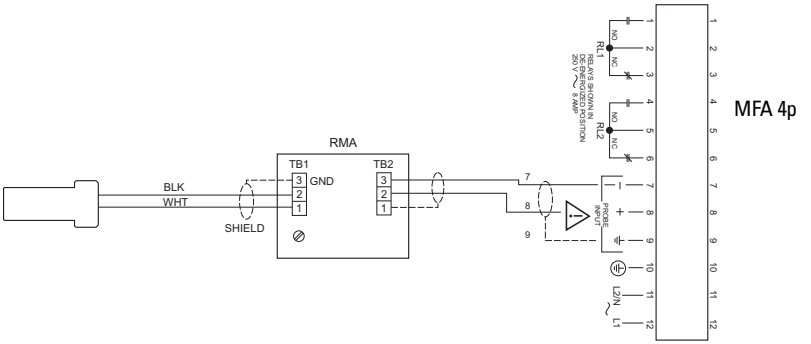
Layout

MFA 4p Circuit Board



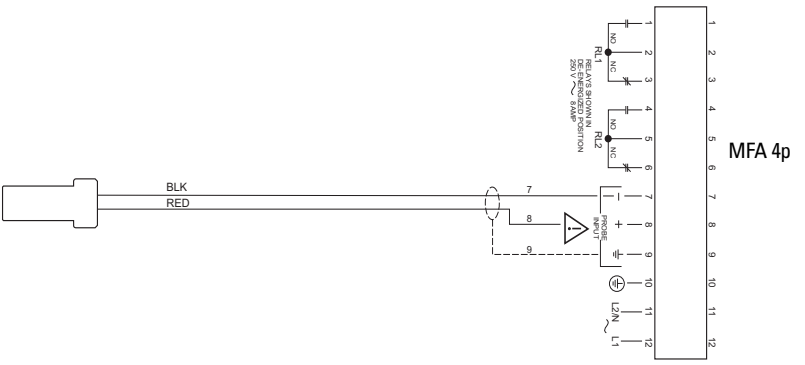
Interconnection

MSP-3, or 9 Probe with RMA (remote mounted pre-amplifier)



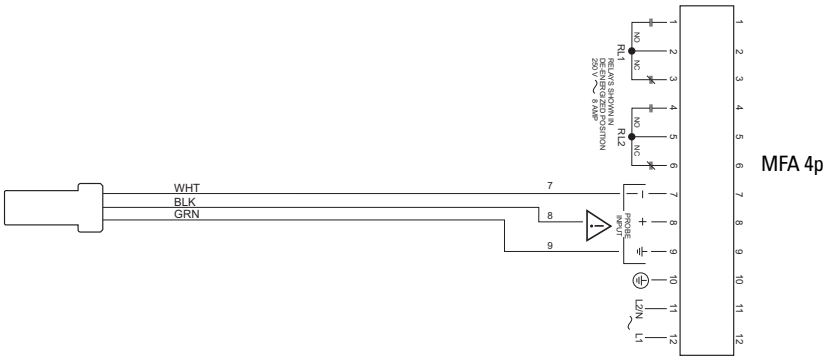
Maximum cable length from probe to RMA is 30 m / 100 ft of shielded cable, 18 ga. wire. See table on page 9 for cable lengths from RMA to main group.

MSP-12 Probe with IMA (internally mounted pre-amplifier)



Wire can be run in conduit common to motor supply or control wiring. Connection to probe leads can be made under probe cap. See table on page 9 for lengths from probe at MFA 4p.

XPP-5 with IMA (internally mounted pre-amplifier)



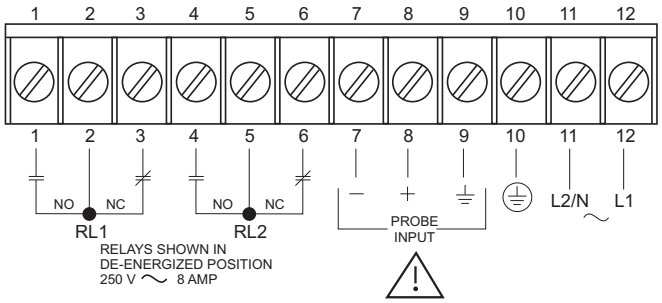
XPP-5 cable must be run in dedicated, approved metal conduit, boxes and fittings and to procedures in accordance with all governing regulations. See table below for lengths from probe at MFA 4p.

Note: Refer to Interconnection Diagram for the XPP-5 (drawing number 23650131) on page 21**.**

Cable length from RMA or IMA to MFA 4p

Wire gauge	Length in feet	Length in metres
22 AWG (0.34 mm^2)	2500	760
18 AWG (0.75 mm^2)	5000	1520
12 AWG (4 mm^2)	25000	7600

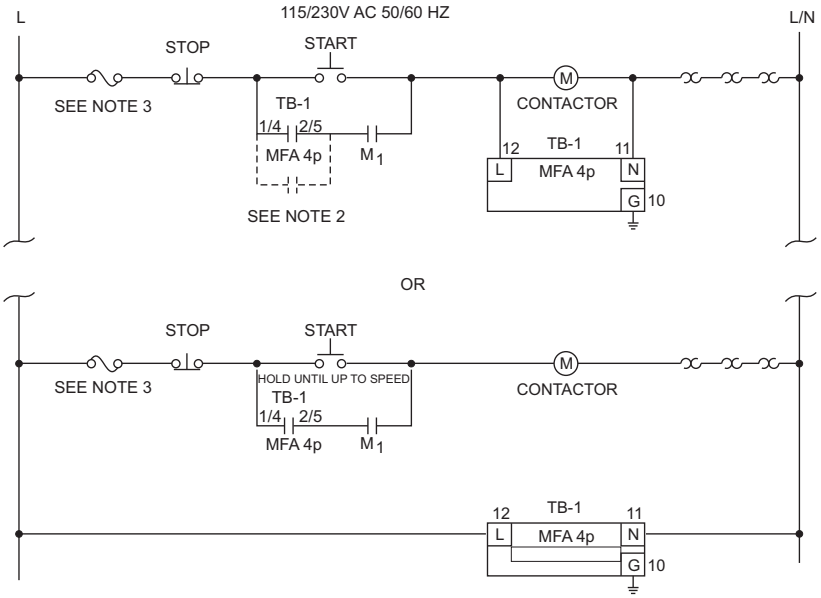
Connection to power:



- Terminal 10 ⏚ must be connected to reliable ground.
- The equipment must be protected by a 15A fuse or circuit breaker in the building installation.
- A circuit breaker or switch in the building installation, marked as the disconnect switch, shall be in close proximity to the equipment and within easy reach of the operator.
- AC input circuit, relay circuits, min. 14 AWG copper wire
- Recommended torque on terminal clamping screws, 7 in.lbs. max.

! WARNING: All field wiring must have insulation suitable for at least 250 V.

MFA 4p Wiring for Automatic Start Delay



Notes:

1. Interlocks and Safety Pull Switches are not shown.
2. If **START** is initiated by programmable logic controller, closure time may be too brief to allow MFA 4p contact to latch. In this case, program a timer contact into the circuit.
3. CSA requires an 8A or less fuse to protect contacts. For 240 V AC, protect the contacts with a 1500 VA transformer as well.

Should the **Time Delay** feature on start-up not be required, power should be applied continuously from a separate source and the potentiometer turned to zero. This is usually necessary for automatic up-stream start up of conveying devices after the down-stream drive has reached its operation speed.

Operating Principles

MFA 4p

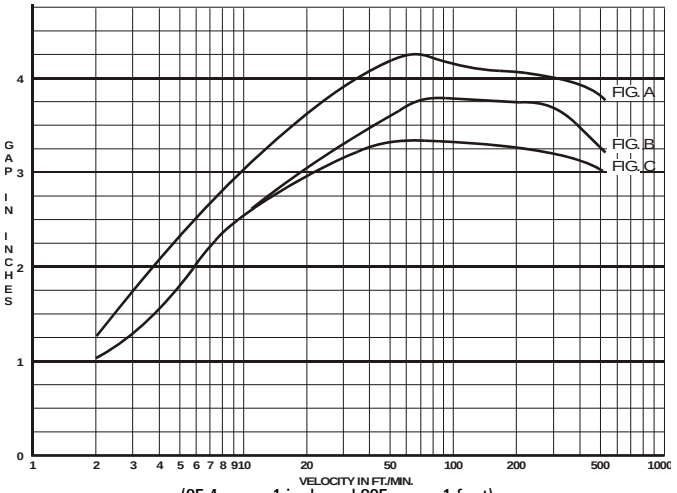
Milltronics MFA 4p is a highly sensitive, single setpoint motion sensor alarm unit, used with MSP and XPP probes. The probe detects an increase or decrease in the speed of rotating, reciprocating, or conveying equipment and sends the information to the MFA 4p. The MFA 4p works with a pre-amplifier which can be internal to the motion sensing probe, or remote from the motion sensing probe.

Pulses generated from the probe are continually compared to the adjustable setpoint. If the pulse rate is lower than the setpoint, the alarm relays operating in a fail-safe mode will de-energize, indicating failure. The relays will not energize until the pulse rate increases above the setpoint.

Probe

The Milltronics probes work on the principle of Faraday's Laws of Electromagnetic Induction. When a ferromagnetic object enters the probe's permanent magnetic field, it distorts the flux causing it to cut the coil windings and generate a voltage. This voltage is proportional to the strength of the magnet and the number of wire turns in the coil (constant in the Milltronics probes) and the speed at which the ferrous target passes through the flux. The generated voltage is also inversely proportional to the square of the distance between the target and the probe.

The relationship between speed and gap of a standard probe:



(25.4 mm = 1 inch and 305 mm = 1 foot)

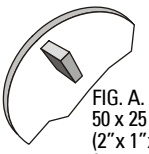


FIG. A.
50 x 25 x 50 mm
(2"x 1"x 2")
ferrous block

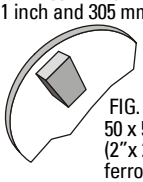


FIG. B
50 x 50 x 25 mm
(2"x 2"x 1")
ferrous block

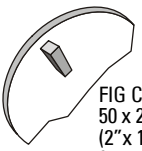


FIG C
50 x 25 x 25 mm
(2"x 1"x 1")
ferrous block

The resultant line indicates the threshold tolerance of the accompanying MFA 4p electronics. For example, in **FIG. A**, a 100 mm (4") gap requires a minimum velocity of about 10 m / minute (35 ft / minute): with a velocity of 0.61 m / minute (2 ft / minute), a maximum gap of 31 mm (1.25") is possible.

Note: 25.4 mm = 1 inch and 0.305 m = 1 foot

The graph was plotted from tests using four ferrous blocks set equidistantly on a 406 mm (16") diameter circle on a non-ferrous disc.

The physical shape of the ferrous target generally becomes important at low velocities or large gaps. At these points, tests indicate that a cubic shape gives the best results due to the sudden change it causes in the magnetic field.

An increase in block size beyond 50 x 50 x 25 mm (2" X 2" X 1") is generally not as effective as minimizing the gap, except at very low velocities.

Milltronics manufactures probes to suit a wide variety of environments: low temperature, high temperature, corrosive, and Class I, II and III applications.

Pre-Amplifier (IMA and RMA)

The pre-amplifier accepts the voltage pulses generated by the probe and converts them into noise-immune current pulses. Current levels are 12 mA low and 45 mA high. The pre-amplifier comes internally mounted in the probe, or in an enclosure for remote mounting.

Internally mounted pre-amplifiers are called IMAs. Remote mounted pre-amplifiers are called RMAs.

MFA 4p Operation

The MFA 4p provides a short circuit protected, +24 V DC unregulated supply to the pre-amp. In the event that the interconnecting wiring is shorted, output current from the MFA 4p is automatically limited and the on-board alarm relays are de-energized to indicate failure.

The output current pulses from the pre-amp are super-imposed onto the dc current supply. These are monitored by Probe LED 1, which is illuminated at the rate of the incoming pulses and is useful for positioning the probe.

The rate at which the pulses are received by the MFA 4p is compared to a setpoint reference signal from the time base generator.

Although two pulses within range are required to energize the relays, as long as the frequency of the incoming pulses exceeds the setpoint frequency (or is less than that of the setpoint in the case of overspeed detection), the MFA 4p keeps the alarm relays energized. The reference generator is frequency adjustable by the pulses per minute (ppm) switch and potentiometer.

The alarm relays will de-energize after two time constants of the setpoint when the frequency of the incoming pulses falls below that of the setpoint (or exceeds that of the

setpoint in the case of overspeed detection). The relay status is indicated by Relay LED 2, which is illuminated when the relays are energized (normal).

The MFA 4p has a 0 to 60 second time delay feature, allowing the monitored device to accelerate to normal running speed before monitoring begins.

This feature is activated when power is applied to the MFA 4p in parallel with the motor starter contact coil. The time delay circuit simulates normal operating conditions for the amount of time as set by the **Start Delay** potentiometer, keeping the alarm relays energized. If the monitored device does not reach normal speed before the set time period, the relays will de-energize giving an alarm condition. This feature is not applicable in the overspeed detection mode.

Calibration

The probe and pre-amplifier require no calibration.

Connect the probe, pre-amp, and MFA 4p as shown in the Interconnection diagrams on pages 8 and 9. Connect the MFA 4p to power as shown in the Power Connection diagram on page 10, and if applicable, as shown for Automatic Start Delay on page 11.

Note: To help the calibration procedure, short N.O. contacts of relays to prevent motor shut-down (terminals 1 to 2 and/or 4 to 5). This allows the system to run uninterrupted until an operating setpoint is established.

MFA 4p (Refer to MFA 4p Circuit Board layout on page 7.)

1. Operate monitored equipment at its normal operating speed.
2. Confirm that Probe LED 1 is pulsing at a regular frequency.
3. Set **Start Delay** fully counter-clockwise **(CCW)** to **0** seconds.

Underspeed

1. Set switch **SW3** to **Underspeed**.
2. Set **pulses per minute (ppm)** switch **SW2** to **X 100** position.
3. Turn **ppm** potentiometer fully clockwise **(CW)** to **30**.
4. Determine incoming pulse rate by slowly turning **ppm** potentiometer **CCW** until relay LED 2 goes on. As the MFA 4p requires 2 pulses within range before energizing relays, low **ppm** applications (e.g. **2 ppm**) may require stepping of potentiometer at appropriate time intervals.
5. If no response is obtained when you set the **ppm** potentiometer to **3** (below this stability suffers), reset potentiometer fully **CW**, set switch **SW2** to **X 10** and then **X 1** if required, and repeat step 4.
6. When Relay LED 2 goes on, indicating the incoming pulse rate, turn potentiometer **CCW** slightly past this point to obtain an operating setpoint that allows for normal fluctuations due to load and voltage variations. For 50% of full speed, set potentiometer (and **SW2** if required) to halfway between incoming pulse rate of normal speed and **0** ppm.

7. Set **Start Delay** by adjusting potentiometer so that equipment being monitored can attain normal operating speed before LED 2 can turn off.

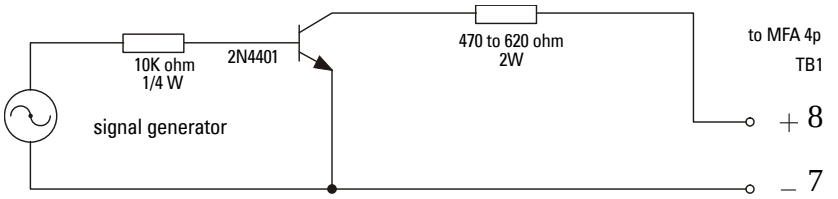
Overspeed

1. Set switch **SW3** to **Overspeed**.
2. Set **ppm** switch **SW2** to **X 1** position.
3. Set **ppm** potentiometer fully **CCW** to **0**.
4. Determine incoming pulse rate by slowly turning **ppm** potentiometer **CW** until Relay LED 2 goes on. Because the MFA 4p requires 2 pulses within range before energizing relays, low **ppm** applications (e.g. **2 ppm**) may require stepping of potentiometer at appropriate time intervals.
5. If no response is obtained when you set the **ppm** potentiometer to **3,** (below this stability suffers), re-set potentiometer fully **CCW** and set switch **SW2** to **X 10,** and then **X 1** if required, and repeat step 4.
6. When Relay LED 2 goes on, indicating the incoming pulse rate, turn potentiometer **CW** slightly past this point to obtain an operating setpoint that allows for normal fluctuations due to load and voltage variations.

Remember:
If N.O. contacts were shorted as described in final note of calibration preamble, remove them now as calibration is complete.

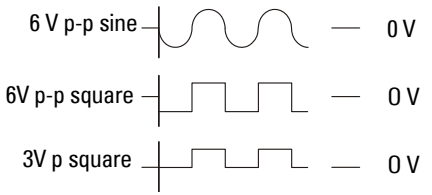
Signal Generator Interface

The following circuit may be used for calibrating or for troubleshooting the MFA 4p.



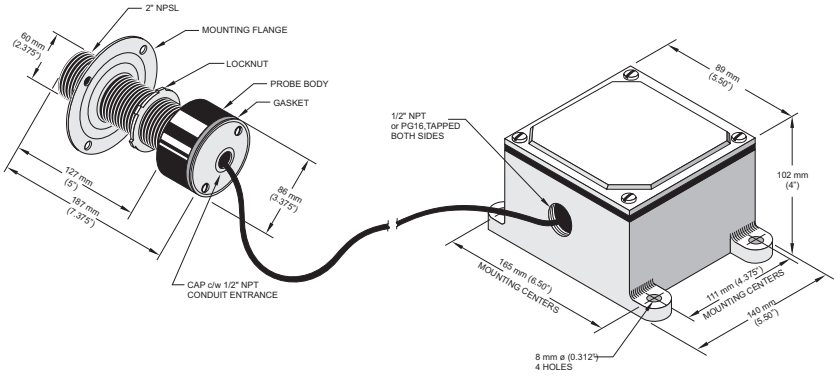
Circuit substitutes operating probe and pre-amp.

Set signal generator for:



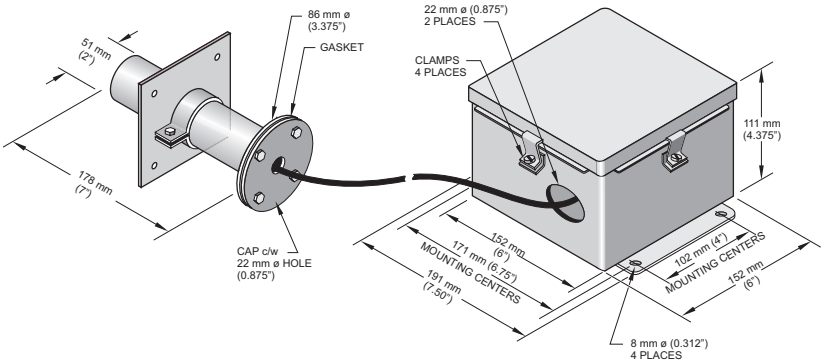
Probes

High Temperature Probe MSP-3

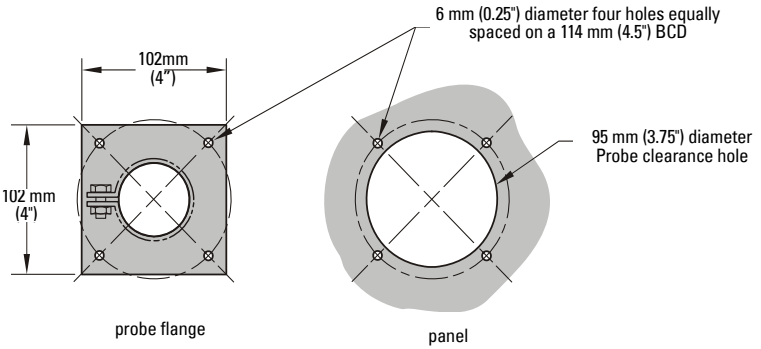


- Cast aluminum body comes with cast aluminum cap and zinc flange, zinc plated locknut, and silicone rubber gasket
- See page 22 for Flange and Mounting Details
- Pre-amp is mounted in a NEMA 4 cast aluminum enclosure

Stainless Steel Probe MSP-9



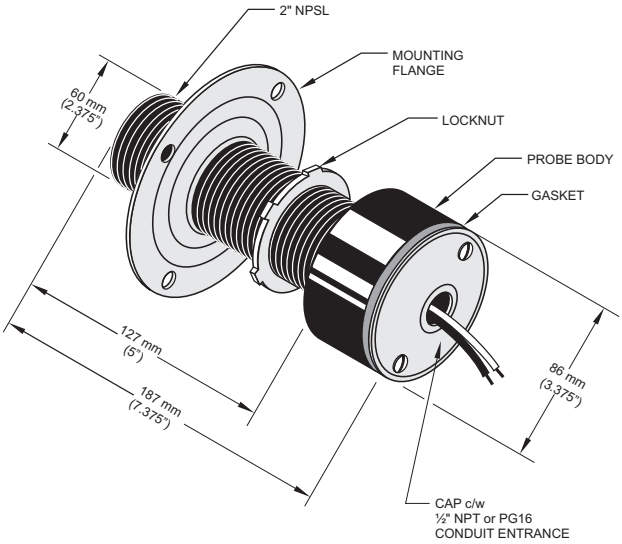
Mounting Details



- For high temperature and corrosion resistance applications
- 304 stainless steel body comes with stainless steel clamp and silicone gasket
- 1.5 m (5 ft.) Belden 83321 Teflon®[1] cable potted in probe
- Pre-amp is mounted in an enamel painted steel Hammond 1414N4E enclosure

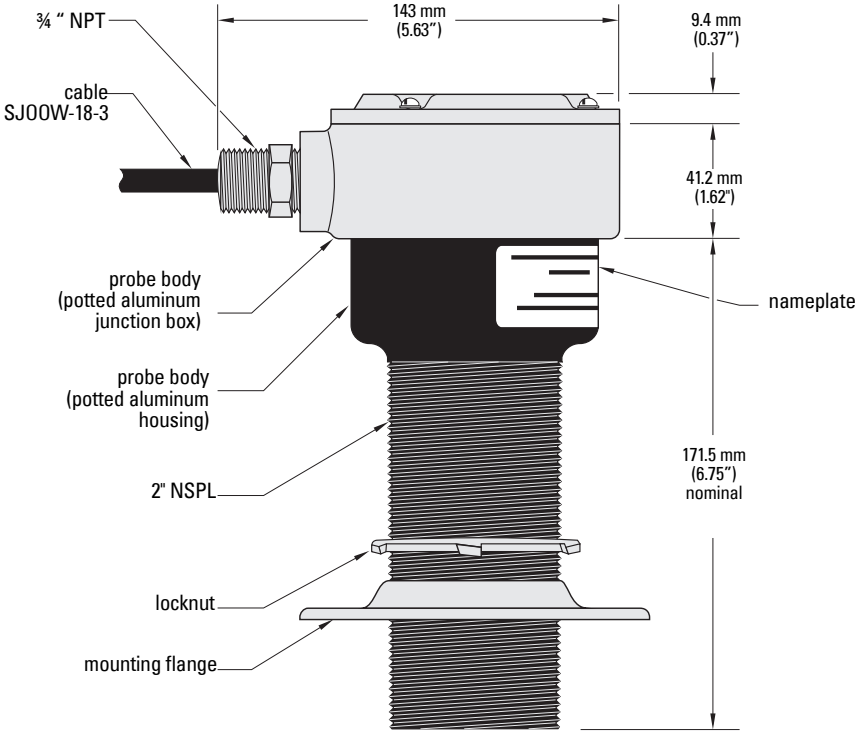
1. Teflon is a registered trademark of E.I. du Pont de Nemours and Company

Standard Probe MSP-12



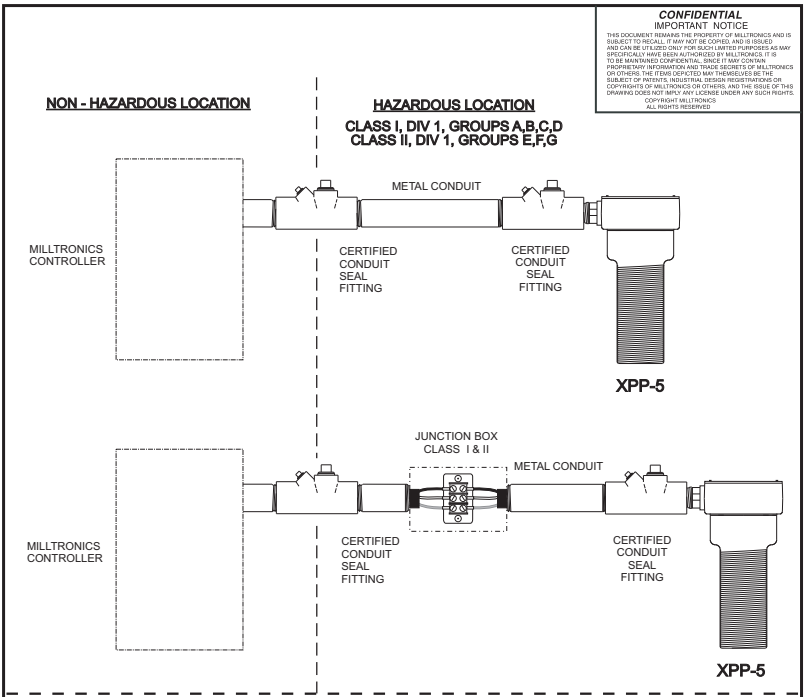
- Aluminum body comes with die-cast aluminum cap and zinc flange, zinc plated locknut, and neoprene gasket
- See page 22 for Flange and Mounting Details
- Pre-amp is potted in the probe body and comes with two 127 mm (5") long hook-up wires

Hazardous Locations XPP-5



- C.S.A Approved for:
  Class I, Div.1, Gr. A, B, C & D
  Class II, Div 1, Gr. E, F & G
  Class III
- aluminum body with die-cast flange and zinc-plated locknut
- see page 22 for mounting details, and pages 9 and 21 for interconnection information.
- pre-amp and cable potted in the probe's body

Interconnection Diagram for the XPP-5



NOTES :

1) THE XPP-5 CABLE MUST BE TERMINATED IN AN AREA EXTERNAL TO HAZARDOUS LOCATIONS, CLASS I, DIV 1, GR. A,B,C,D & CLASS II, DIV 1, GR. E,F,G.

2) A SEAL SHALL BE INSTALLED WITHIN 50 mm OF THE XPP-5 CONDUIT HUB FOR CLASS I, DIV. 1 HAZARDOUS LOCATION ONLY.

3) INSTALLATION SHALL BE DONE IN ACCORDANCE WITH CANADIAN ELECTRICAL CODE PART 1 REQUIREMENTS.

4) DO NOT EXPOSE THE XPP-5 TO DIRECT SUNLIGHT, OTHERWISE PROVIDE SUN SHIELD.

5) STATIC HAZARD, DO NOT RUB WITH DRY CLOTH.

No.	REVISION DESCRIPTION	DWG BY	APPRO.	DATE
2	REVISED HOUSING THREADS PER. ECN #00-000-0-0070	RWG	SN	JULY 11/00
1	REVISED CABLE AND TERMINAL CONNECTOR PER. ECN #00-000-0-0037	RWG	SN	APRIL 18/00
0	FOR CONSTRUCTION	RWG	SN	MARCH 27/00

USE DIMENSIONS ONLY - DO NOT SCALE

DRAWING SCALE	N. T. S.
DRAWN BY	B. GRAY
CHECKED BY	R. CLOSS
APPROVED BY	S. NGUYEN

TOLERANCES UNLESS OTHERWISE NOTED
1 PLACE DECIMAL ± 0.030" FRACTIONS ± 0.030"
2 PLACE DECIMAL ± 0.010"
3 PLACE DECIMAL ± 0.005" ANGLES ± 0.5°

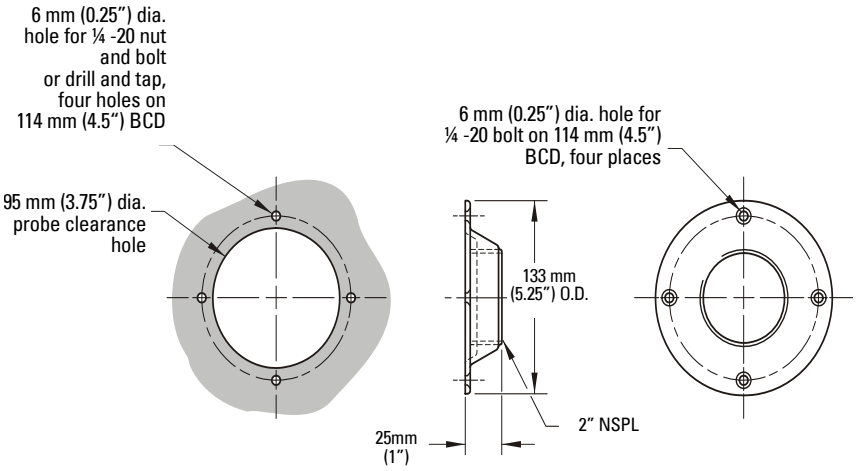
THIRD ANGLE PROJECTION

TITLE
XPP-5
INTERCONNECTION DIAGRAM

MILLTRONICS
Mass Dynamics Division

FILE No. 2365013102	SIZE	DRAWING No.	REV.
PLOT AT 1=1	A	23650131	2
JOB No.		SHEET 1 OF 1	

Mounting Details

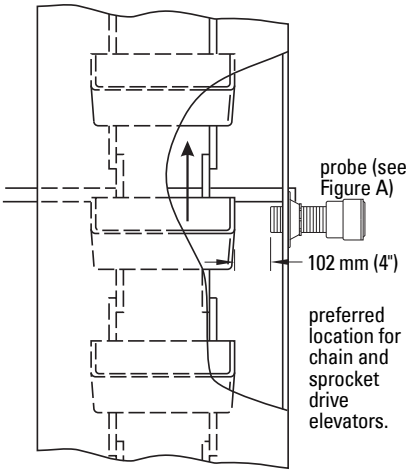


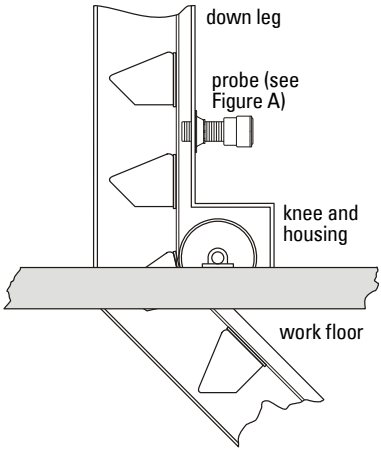
Mounting Flange

APPLICABLE TO ALL PROBES

EXCEPT MSP-9

Bucket Elevators



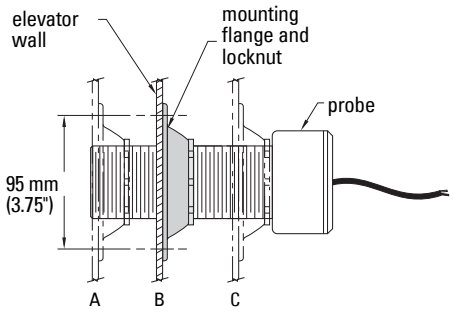


For chain and sprocket drive elevators, place the probe so that the gap between the bucket and the probe does not exceed 102 mm (4"). To prevent damage to the probe from eccentric bucket motion, ensure that the gap is not less than 12.5 mm (0.5") in the worst condition.

Preferred location for belt-driven elevators with ferrous bucket spacing greater than 76 mm (3"), and non-ferrous buckets with ferrous bolts.

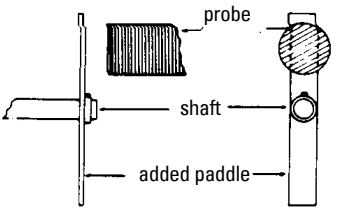
For ferrous buckets with spacings less than 76 mm (3") locate probe on the front of the leg.

Figure A

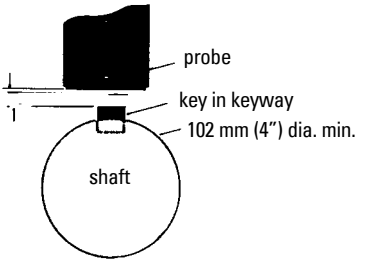


For elevators with ferrous walls, cut 88 mm to 95 mm (3.5" to 3.75") hole in the elevator wall. Any position from A to C may be used to maintain the gap.

Shafts



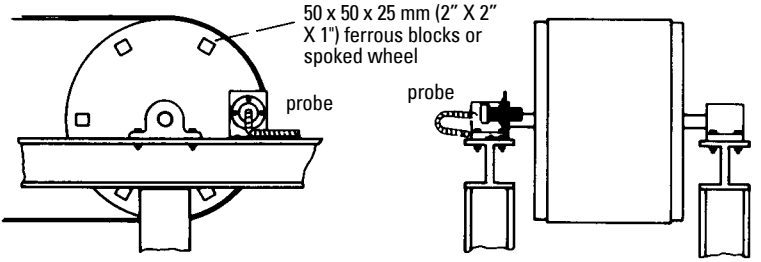
safety shield not shown



These methods are viable if the speed is such that the blades or key will provide the number of pulses required at a minimum velocity of 1.5 m / minute (5 ft. / minute). In applications where exposed moving parts are required, safety shields and precautions should be applied.

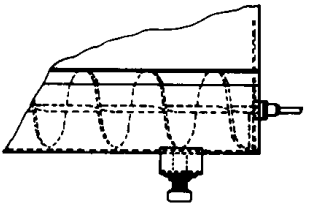
Where conditions prevent the sensing of buckets, a belt pulley or paddle mounted on an exposed shaft end, preferably the tail pulley, may be used.

Belt Conveyors

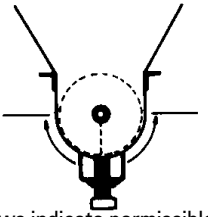


Potential for damage in each application governs the minimum gap allowable. Maximum gap for operation is 102 mm (4"), optimum 25 mm to 50 mm (1" to 2").

Screw Conveyors



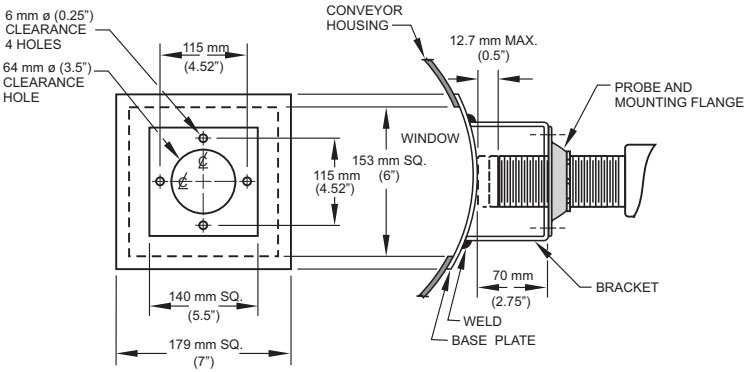
The probe should be located at the idler end (usually feed end)



Arrows indicate permissible placement range of the probe

A ferrous mass added behind the flight of a screw conveyor, where it passes the probe aids Borderline Operation. This mass must be added for all non-ferrous screws.

Non-Ferrous Window

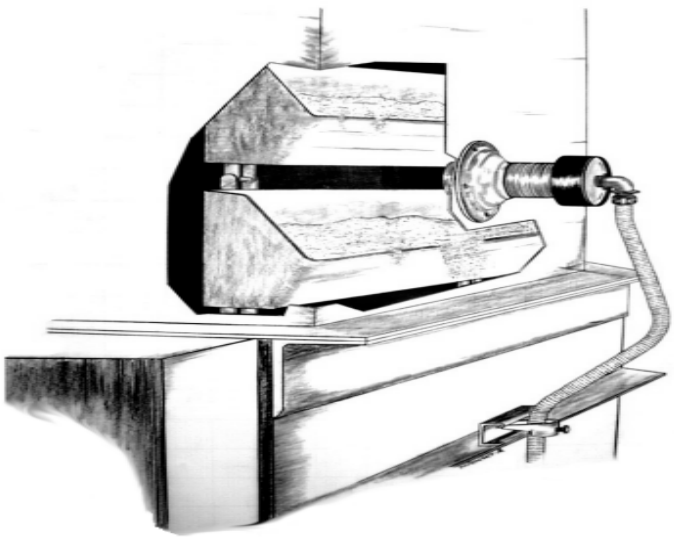


MINIMUM RECOMMENDED DIMENSIONS SHOWN

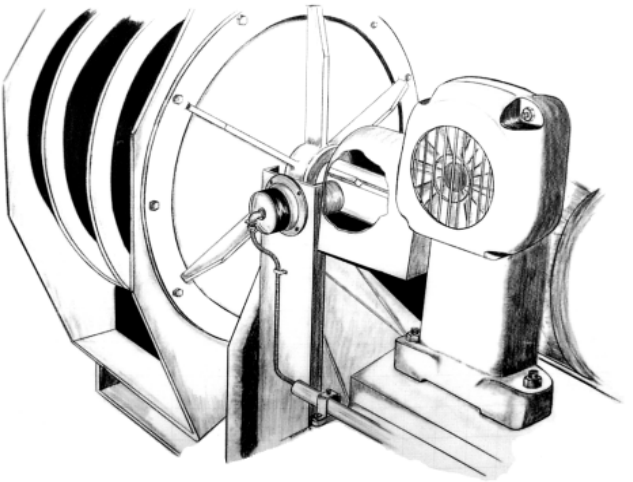
For screw conveyor with trough over 3.1 mm (0.125") thick or for high temperature applications. The dimensions shown for the base, window, and bracket are the minimum recommended with tolerances of ± 0.8 mm (0.031"). Use 305, 310, or 316 stainless steel, brass, or aluminum.

The probe may not touch the window if temperatures are in excess of 60 °C (140 °F) when using the low temperature probes or 260 °C (500 °F) when using the high temperature probes.

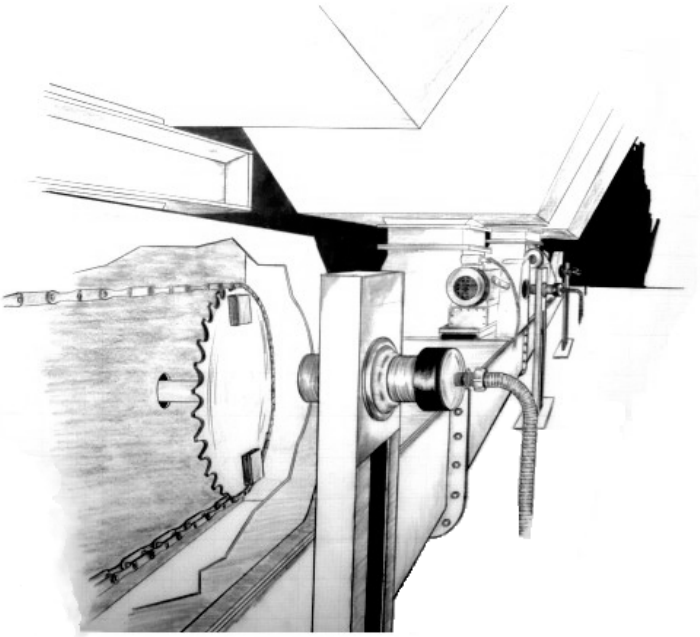
Bucket Elevator



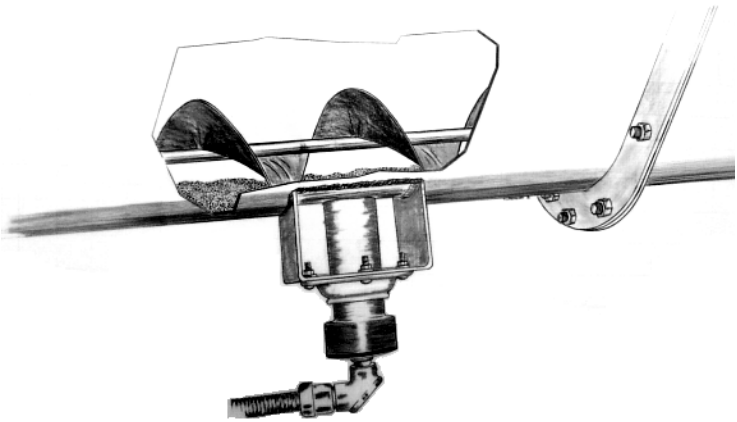
Rotating Shaft of Rotary Feeder



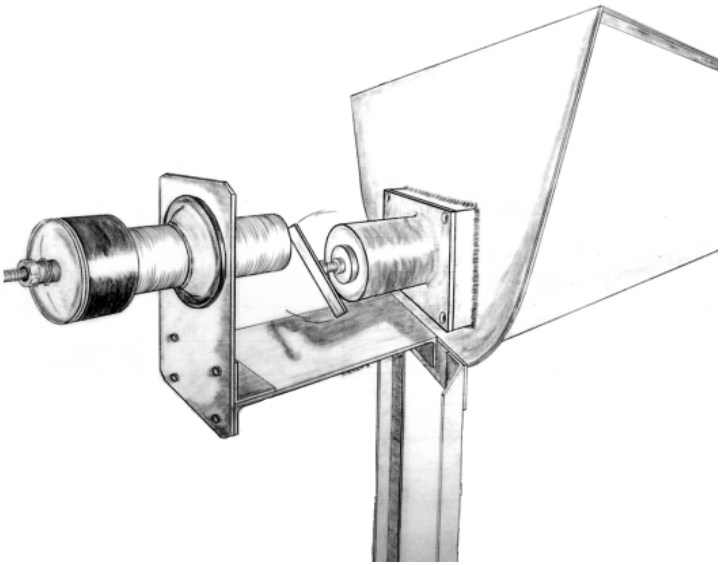
Drive Sprocket on Rotary Feeder



Screw Conveyor Flights



End Bearing on Screw Conveyor



Troubleshooting

	LED 1	LED 2	term 7/8 (note 1)	C8	term 1/2 relay 1 out	term 4/5 relay 2 out
normal	pulsing	on	24 V	27 V	closed	closed
alarm	pulsing	off	24 V	27 V	open	open
probe reversed polarity	on	off	20 V	27 V	open	open
probe wiring open circuit	off	off	27 V	27 V	open	open
probe wiring short circuit	off	off	0 V	27 V	open	open
relay defective	pulsing	on	24 V	27 V	open	open

Notes:

- Voltage levels are dc, nominal values, and may appear to be pulsing, coincidental with LED 1.
- If diagnosis does not solve the malfunction, the probe, pre-amp or MFA 4p may be defective.
- If no spare circuit boards or probes are available for interchanging, the MFA 4p may be tested as follows in order to determine which section is defective:

  a. To find out if the MFA 4p is defective:
     i. Disconnect the pre-amp.

     ii. Set ppm switch **SW2** to **X 1** position and turn potentiometer to **15**.

     iii. Connect one lead of a 530 ohm, 1 watt resistor to terminal 7 and then momentarily contact terminal 8 at a rate of once per second. If the MFA 4p is functional, the relays will energize after two pulses and de-energize approximately 8 seconds after last pulse.

  b.To find out if the RMA is defective:
     i. Disconnect pre-amp from the MFA 4p. Attach probe across terminals TB1 1/2 and a 24V DC(floating) power supply across terminals TB2 3/2, according to the RMA Interconnectiondiagram on page 8.

     ii. Run equipment to be monitored at normal operating speed or pass a ferrous object in front of and as close to probe as possible at a continuous rate.

     iii. With an oscilloscope, look for approximately 6V peak to peak pulses or alternating hi/lo levels across ground and link 3. Or with an amp meter connected in series between the RMA and the 24V DC power supply, look for hi/lo levels of approximately 12mA/40mA alternating at the rate of the passing ferrous objects.

c.To find out if the probe is defective (non-IMA type only; i.e. MSP-3, and MSP-9):

i. Disconnect probe from pre-amp.

ii. Connect an ohmmeter across the black and white leads.

iii. Nominal probe impedances are as follows

MSP- 3 and MSP- 9	750 ohms

If impedance deviates substantially from these values, an open or short circuit condition is indicated.

Maintenance

The Motion Failure Alarm MFA 4p requires no maintenance: however, we recommend a program of periodic checks.

If it is necessary to clean the enclosure and circuit boards:

1. First, make sure the power is disconnected at the main breaker.
2. Use a vacuum cleaner and a clean, dry paint brush.
3. Check all electrical contacts for corrosion and arcing.

It is a good idea to periodically check the face of the probe: it should be free of material build-up, corrosion or deformation.

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For more information

www.siemens.com/level

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