

# Magnicator® II

Magnetic Liquid Level Indication Products



The  
***Magnet***  
Matters

**JERGUSON®**



# A Superior Float Magnet Creates a Superior Level Indicator

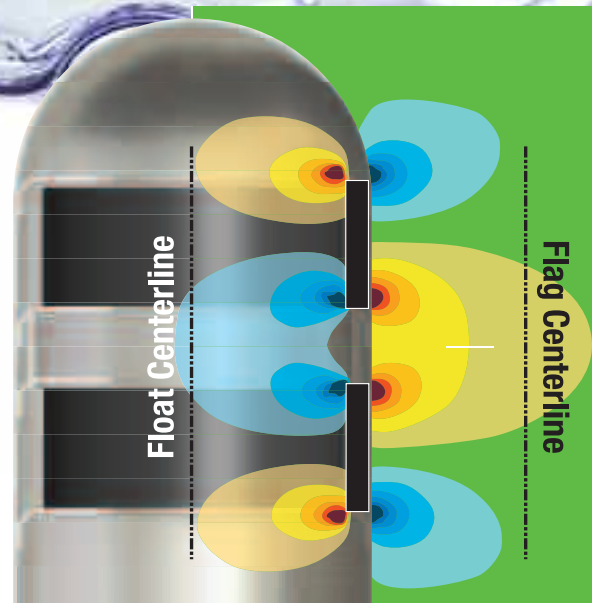


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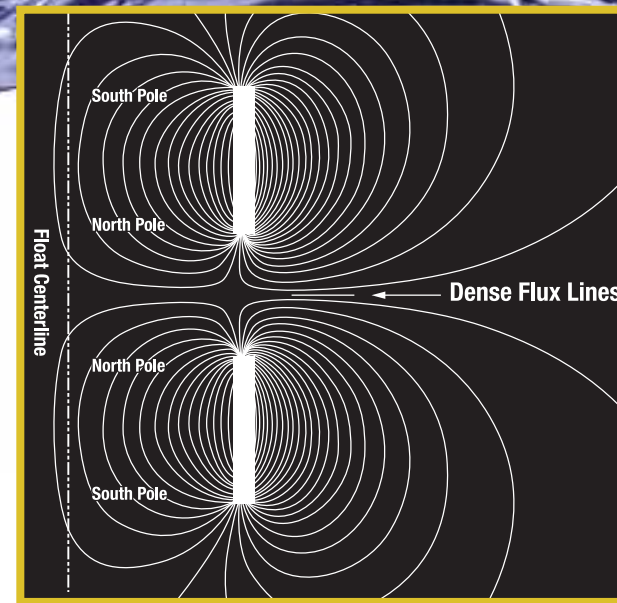
### Magnetic Field Density Diagram of Magnicator II Float

*Reliability is in the physics. A uniquely strong north magnetic field activates flags, switches and transmitters with a certainty not found elsewhere because only the Magnicator II has a magnet arrangement this powerful, and this focused.*



If you are looking for reliable performance from a magnetic level indicator, start with the float magnet. The stronger and more focused the magnetic field of the float, the more reliable the level indicator...and the more reliable the function of magnetically-actuated flag indicators, switches and transmitters.

**The Jerguson Magnicator II float has the strongest magnetic field of any magnetic level indicator.** Its patented design (U.S. Patent 5,743,137) uses two 360° annular Alnico 8 ring magnets with opposing north poles.



Magnetic Flux Density Plot of Magnicator II Float

*Opposing magnetic poles project concentrated flux lines away from the outside diameter of the magnets. This forced deflection creates a stronger field than any other float magnet arrangement, greater than 90 Gauss at the centerline of the indicator flags. Physics has guaranteed that the Magnicator float has the strongest magnetic field...which translates to the most reliable instrument.*



Magnicator II Float      Typical Float from other Manufacturer

*Typical floats from other manufacturers employ a circular array of Alnico 5 Bar Magnets. Other brands use a single ring magnet. Neither can produce as intense a magnetic field as the Magnicator II float.*

## How it Works

The Magnicator II gage is connected to a process vessel. The chamber, or "column," contains a sealed float with a permanent magnet assembly which rises and falls as the liquid level changes in the process vessel.

The indicator housing is parallel to the gage column but completely isolated from process liquid. Indicator flags are rotated by the float magnet assembly as it moves up and down in the chamber.

Magnetic liquid level gages are an attractive alternative to sight glasses for many applications. They provide improved visibility, reduced maintenance and eliminate the leak paths associated with sealing glass.





# Robust Construction Inside and Out

Your demanding application deserves a gage with the guts to stick it out for a long, long time. In addition to complying with ASME B31.1 for power piping and ASME B31.3 for process piping, all Magnicator® II Magnetic Level Gages incorporate additional design and construction benefits you will not find on any comparable product:

## Schedule 40 Chamber Construction is Standard

Most other magnetic level gages are offered as Sch 10, with an upgrade to Sch 40 available. Since most plant piping specifications prohibit Sch 10 pipe, this can be misleading. The difference between Sch 10 and Sch 40 is substantial, with a lower pressure rating and a much greater chance of damage during shipping, handling and construction. For even higher pressures, we offer Sch 80 and Sch 160 chambers (see page 11 for details). This is directly related to the strength of our patented float magnet assembly. No other magnetic level indicator can function as reliably with such robust piping.



## Smooth Autogenous Welds

All Magnicator II floats have full penetration autogenous welds. This means an orbital welding machine has fusion-welded the two halves using only heat and no filler metal. This process—the same used for high purity and sanitary tubing—produces an ultra-smooth weld, without a bead which could interfere with the float's motion.



Schedule 40 construction is standard for Magnicator II gages. Rated to 2200 psi @ 100° F per ASME B31.3

Schedule 10 is not appropriate for most process applications. Rated to 1200 psi @ 100° F per B31.3



# Superior Indicators Mean You Can Trust What You See

Jerguson recommends flag indicators for virtually all applications, so flags come as standard on Magnicator® II products\*. However, there is nothing “standard” about their design and construction. They are the most reliable, shock-resistant and longest lasting available.

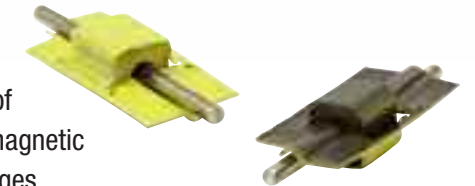
\* (Follower-style indicators are available as an option – see Options & Accessories, page 10.)



## The Jerguson Flag

- Each flag is a single stainless steel precision stamping with its own permanent ceramic magnet
- Each flag has dual rotation points and is free to rotate, a redundancy plastic flags do not have

- At rest, each flag is strongly attracted to each adjacent flag of the same color, with an active magnetic field of 200 Gauss at leading edges



This attraction can only be broken by a magnetic field strong enough to cause the flags to rotate (the Magnicator II float assembly), making each flag assembly **extremely shock and vibration resistant**

## Potential Problems with Other Manufacturers' Indicators

Anodized aluminum or plastic flag construction:

- Flags can fade with exposure to UV light (sunlight) or temperatures over 500°F (260°C)
- Rough edges of metal burr or flags can get caught in track



Heat has faded these anodized aluminum flags to make them nearly indistinguishable.

Followers are “single-point” indicators, versus “multiple-point” flag style indicators. With 2 1/2 flags per inch, if you “lose” one flag (which is unlikely), you still have many working to indicate level.

- Vibration (water hammer), rapid movement and turbulence can cause a follower to be “dropped”
- Weak magnetic couplings between flags and float magnet can lead to false trips as shown



Fallen Follower



False Trips

This style relies on colored stickers applied to plastic flags.





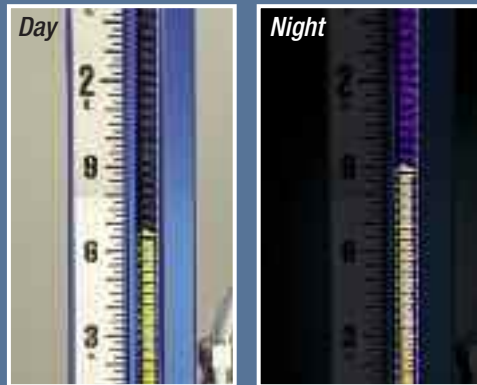
# NightStar LED Illuminators Provide 24 Hour Visibility

## Here's a Really Bright Idea

NightStar Indicators for the Magnicator® II make a level gage continuously visible... night or day with bright LED illumination. No more flashlight searches; no more spending more time than needed in process areas.

NightStar Illuminators provide an array of bright LEDs to shine on standard mechanical flag indicators. No light or low-light, the operator can easily and reliably verify level.

- High contrast indication
- Not angle dependent – viewer can see clearly from many positions
- Reduced operator exposure in process areas can increase safety
- LEDs have a nominal life of 10 years
- Approved for use in Class I, Div. 1 classified locations

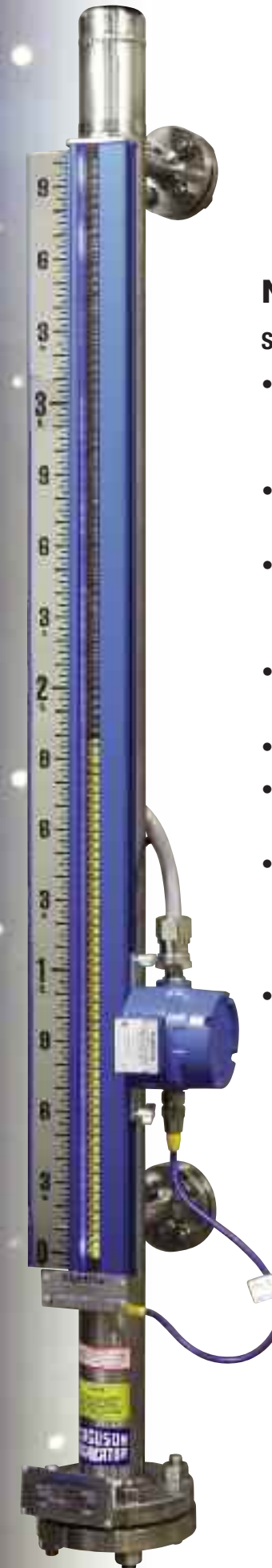


NightStar LED base illuminator for the Magnicator® II

## An Easy Upgrade for Any Magnetic Level Gage



NightStar Indicators can be field-upgraded on any Jerguson magnetic gage utilizing the existing float (or other manufacturer's gage by replacing both the float and indicator).



## NightStar Indicator

### Specification Overview

- FM & CSA Approval to:
  - Class I, Div. 1, Grps. B, C, & D
  - Class II, Div. 2, Grps. E, F, & G
- Power Supply:
  - 120 or 240 VAC
- Power Consumption:
  - < 750 mA @ 120 VAC
  - < 375 mA @ 240 VAC
- Max. Remote Distance from Power Supply to Light Strip = ~80 feet (24.3m)
- Electrical Connection: 3/4" FNPT
- Ambient Temperature:
  - 40°F (-40°C) to 170°F (77°C)
- Process Temperature:
  - Up to 450°F (232°C)
  - 450°F (232°C) to 600°F (316°C) with air purge kit on indicator
- Protection Methods:
  - Explosion-proof power supply
  - Intrinsically-safe lighting circuit
  - NEMA 4X design

“Not only have the Jerguson magnetic gauges become the standard for our FCCU in Marcus Hook, but our operators specifically request the NightStar on all models we install.”

– Beth Lavine,  
Project Specialist  
Sunoco-Philadelphia Refinery



# Magnicator® II Gage with Guided Wave Radar

## Redundant Sensing Technologies for the Ultimate in Reliable Level Indication

By combining guided wave radar (GWR) with a magnetic level gage, the Magnicator® II Guided Wave Radar (MGWR) brings a new standard of assurance to level indication.

The primary advantage of a guided wave radar (GWR) transmitter over a Magnetostrictive or Reed Switch transmitter is that the GWR transmitter is an independent device that does not rely on the float's magnetic field to obtain a reading. A Magnetostrictive or Reed Switch transmitter measures the position of the float inside the magnetic gage, while the GWR transmitter detects the actual fluid level.

The GWR transmitter obtains an independent reading of the liquid level, providing an accurate output even in the case of a float failure. Also, the GWR transmitter will read the true level of the fluid, even if the density of the product varies. With a magnetic gage, the float is sized for the minimum specific gravity and the gage float position in the fluid will change with the specific gravity.

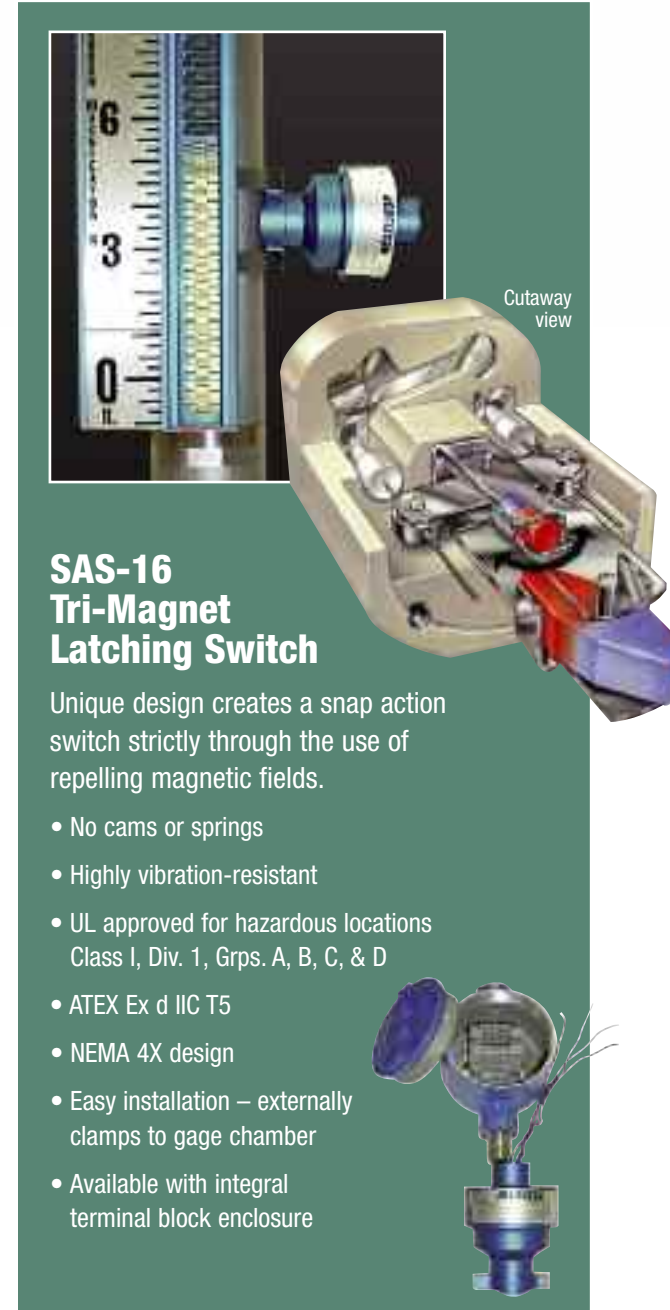


**Guided Wave Radar**  
Changes in product specific gravity do not affect output.

## Transmitter Features

- Measurement independent of density, conductivity, dielectric constant and temperature
- Measurement unaffected by foam or turbulent surfaces
- Process temperatures from -328°F (-200°C) to 752°F (400°C)
- Pressure ranges from full vacuum up to 5802 psi (400 bar)
- Models available for interface applications; both total and interface level can be provided on one Hart® signal
- Models available with gas phase compensation for steam applications
- Communication Protocols
  - 4-20 mA SIL Hart®
  - Fieldbus Foundation™

# Switches and Transmitters



## SAS-16 Tri-Magnet Latching Switch

Unique design creates a snap action switch strictly through the use of repelling magnetic fields.

- No cams or springs
- Highly vibration-resistant
- UL approved for hazardous locations Class I, Div. 1, Grps. A, B, C, & D
- ATEX Ex d IIC T5
- NEMA 4X design
- Easy installation – externally clamps to gage chamber
- Available with integral terminal block enclosure



## MTII-4200 Magnetostrictive Transmitter

- .001" resolution continuous output
- FM & CSA - Class I, Div. 1, Grps. B, C, & D; Class I, Div. 1, Grps. E, F, & G
- ATEX EEx ia IIB + H2 T4
- NEMA 4X design
- Adjustable zero and span
- LCD display and window cover are standard
- Communication Protocols
  - 4-20 mA loop-powered transmitter with Hart® protocol (standard)
  - Fieldbus Foundation™



## RST2 - Reed Switch Transmitter

- 4-20 mA loop-powered transmitter
- 1/2" (Std), 1/4" (Optional) resolution
- UL & C-UL Class I, Div. 1, Grps. B, C, & D Class II, Div. 1, Grps. E, F, & G
- NEMA 4X design
- Field Adjustable Span



## RS-2 or RS-2/2 Hermetically-Sealed Reed Switch

- Low power switches for DCS and starter circuits
- SPDT and DPDT switch configuration
- 120 Maximum VAC; 1 Amp Maximum; 30 Watts Maximum (Volt X Amps = Watts)
- UL & C-UL listed Class I, Div. 1, Grps. B, C, & D
- NEMA 4X design



# Options, Accessories and Special Gages



## Hermetically-Sealed Flag Indicator

- Designed to meet needs of offshore industry, chemical wash-down, and severe environments
- Flag indicators are sealed in glass tube; 100% fused glass end seals
- No gaskets: *can't leak or fog*



## LevelStar® LED Indicators

- LED indicators have no moving parts
- 10 year nominal LED life
- Field-upgradeable; easy clamp-on installation
- FM Approved for use in Non-hazardous (Unclassified) Locations
- Red and green standard; other colors available
- 120/240 VAC
- -40°F (-40°C) to 170°F (76°C) ambient
- Process temperature:
  - Up to 450°F (232°C)
  - 450°F (232°C) to 600°F (316°C) with air purge kit on indicator

Consult our Specification Guide for complete model numbers and configuration options.



## ASME Section I Boiler Code Gage

- Up to 900 psi (62 bar) per code requirements
- Indicator range 2" below and above steam and water connections



## Follower Style

- Gold anodized follower
- Sealed polycarbonate or glass tube
- Aluminum or 316 stainless steel housing



## Hot or Cold Insulation

### Hot Insulation 550°F (287°C) to 1000°F (537°C)

Jacket covers entire gage and includes drawcords at each end for closure. Provided with openings for gage process connections, indicator and switches or transmitters.

- PTFE coated & impregnated fiberglass
- 1" thickness to 550°F (287°C)
- 2" thickness to 800°F (426°C)
- 3" thickness to 1000°F (537°C)
- Stainless steel grommets
- Polypropylene / fiberglass drawcord at ends

### Cryogenic Insulation 32°F (0°C) to -250°F (-156°C)

- Polyisocyanurate foam insulation - 2" thick
- .016" aluminum jacketing with moisture barrier
- All joints sealed
- Optional non-frost extension required

## Combination Sight Glass / Magnetic Gage

- Use glass level gage for calibration and level verification only
- Maintenance is virtually eliminated
- Available as an upgrade for sight glass installations



## Mini Magnicator

- Economical magnetic gage features single bar magnet float
- Pressures to 400 psi (27 bar)
- Temperatures to 500°F (260°C)
- Specific gravity 0.7 or greater
- Local indication only



## Sch 80 and Sch 160 Columns for High Pressure

The focused strength of the Magnicator II float permits reliable operation in heavy wall chambers up to Sch 160.

# TO CONSTRUCT A PART NUMBER

1. MAGNicator® II
2. SELECT STYLE
3. PROCESS CONNECTION SIZE
4. FLANGE CLASS RATING (ANSI)
5. SPECIFY CHAMBER MATERIAL
6. PROCESS SPECIFIC GRAVITY
7. SPECIFY MAXIMUM WORKING PRESSURE (PSIG)
8. SPECIFY MAXIMUM WORKING TEMPERATURE (°F)
9. CENTER/VISIBLE RANGE
10. INDICATOR TYPE
11. OPTIONS

## HOW TO ORDER MAGNicator® II

Part Number:



Magnicator® II

Chamber Style

SF  
ST  
ESF  
EST  
BEF  
EF  
MC  
SW  
ESW

Process Connection Size

04 = 1/2"  
06 = 3/4"  
08 = 1"  
12 = 1 1/2"  
16 = 2"  
20 = 2 1/2"  
24 = 3"  
32 = 4"  
48 = 6"

Flange Class (ANSI)

01 = 150#  
03 = 300#  
06 = 600#  
09 = 900#  
15 = 1500#  
25 = 2500#  
50 = 5000#

General Material

R = 304 / 304L SS  
RA = 304, CS Flanges  
T = 316 / 316L SS  
TA = 316, CS Flanges  
K = Alloy 20  
M = Monel  
TT = Titanium  
LB = Hastelloy®B  
LC = Hastelloy®C  
GS = 321 SS  
ZR = Zirconium  
CP = CPVC  
PF = PVDF (Kynar)  
TC = PFA Coated  
TF = TFE  
CM = Customer Spec.

Specific Gravity

.32 and up

Max. Working Press (PSIG)

Up to 2400 PSIG  
(2400-5600 PSIG available)

Max. Working Temp. (°F)

Up to 1000° F

Centers/Visible Range

Exact Inches (or mm)

Indicator Type

BF = Follower  
SF = Stainless Follower  
FL = Flag (Wafer)

Options

AS = Acrylic Scale  
MS = Metric Scale  
PS = Percentage Scale  
NGS = Negative Scale  
SS = Special Scale (Specify Type)  
SP = Set Point Arrows (Specify Qty)  
DI = Dual Indication (BF Only)  
IF = Interface  
IL = Illuminator  
NF = Non-Frost Extension  
PI = Polycarbonate Indicator  
EH = Electric Heat Trace  
CI = Cold Insulation  
ST = Steam Traced  
IB = Insulation Blanket  
BW = All Butt Weld Construction  
WN = Weld Neck Flanges  
RJ = Ring Joint Flanges  
SE = Stub End/Lap Joint  
NDE = Non-Dest. Exam (Specify Type)  
VV = Valves (Specify)  
FF = Smooth Finish Flanges (125-250 RMS)  
SW = Socket Weld Process Flanges  
NS = No Scale  
NI = No Indicator  
DV = 3/4" Vent / Drain, Plugged  
X = Other (Specify)

### EXAMPLE:

**MII-SF-08-15-TA-.55-1000-500-48.0"-FL-IB-WN**

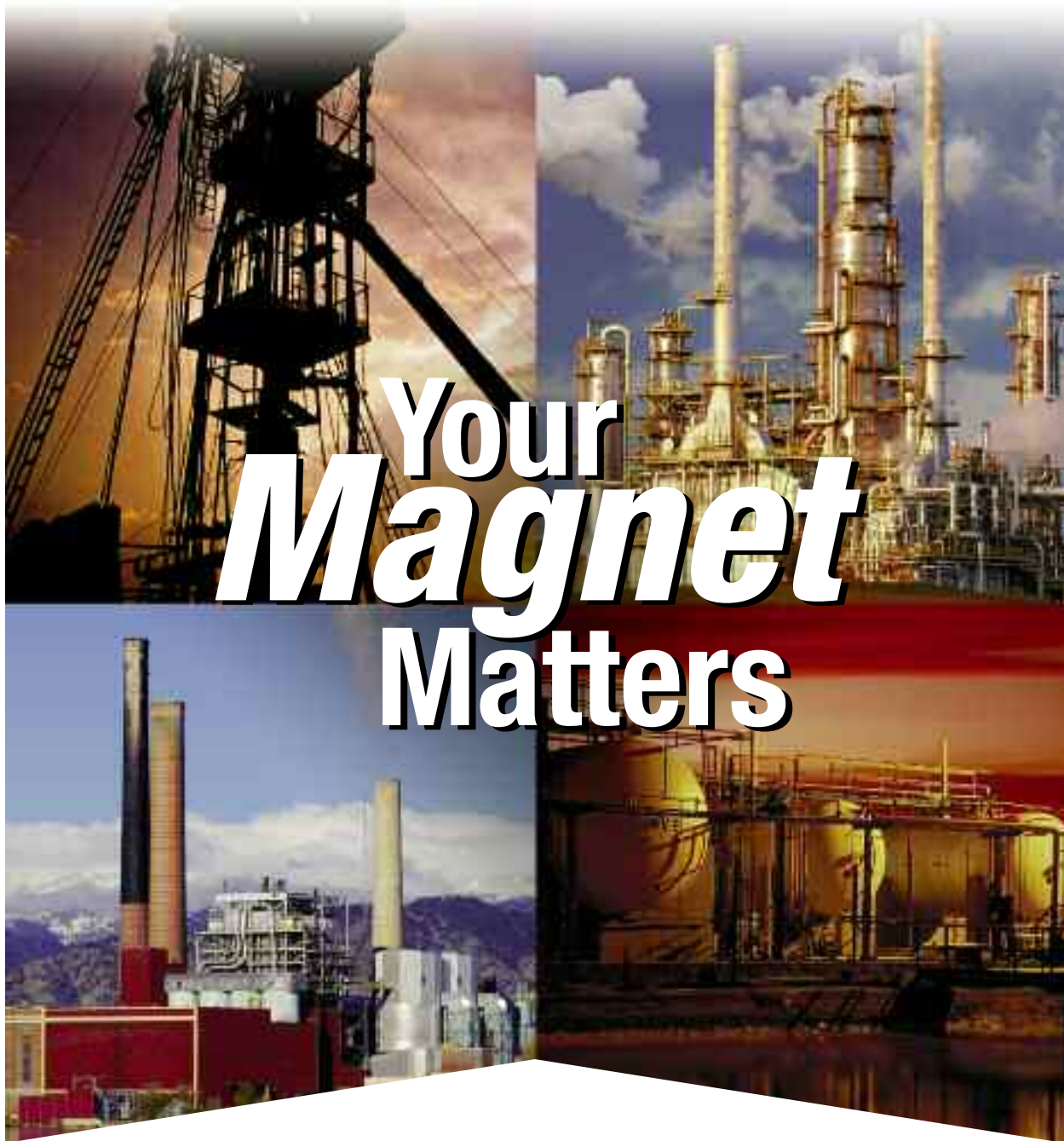
### DESCRIPTION:

- |  |  |
|--|--|
| 2. STYLE SF (SIDE FLANGED)                             | 7. MAX WORKING PRESSURE: 1000 PSIG                   |
| 3. PROCESS CONNECTIONS: 1.0" RF                        | 8. MAX WORKING TEMP.: 500 F                          |
| 4. FLANGE RATING: 1500# ANSI                           | 9. PROCESS CONNECTION C/L: 48.0"                     |
| 5. CHAMBER MATERIAL<br>316SS WITH CARBON STEEL FLANGES | 10. FLAG INDICATION                                  |
| 6. SPECIFIC GRAVITY: .55                               | 11. OPTIONS: INSULATION BLANKET<br>WELD NECK FLANGES |



# Magnicator® II

## Magnetic Liquid Level Indication Products



Your  
**Magnet**  
Matters

**JERGUSON®**

*Products Manufactured by the Clark-Reliance® Corporation*

16633 Foltz Parkway, Strongsville, OH 44149 USA Phone: 440.572.1500 Fax: 440.238.8828  
[www.clark-reliance.com](http://www.clark-reliance.com) [sales@clark-reliance.com](mailto:sales@clark-reliance.com)



ISO 9001:2000