

TECHNICAL SPECIFICATIONS

Pit Level and Pump Data

TS DATA SHEETS

- PP -

Continuing development sometimes necessitates specification changes without notice



Technical Specifications

2008

TS

PP-00

PIT LEVEL



Frequency
Converter



Barrier
Amplifier



Encoder
Interface



Ultrasonic Pulse-Echo Sensor for Monitoring Pit Levels

- Pit volume single active pit
- Pit Volume Totaliser - Active System
- Pit volume single reserve pit
- Pit Volume Totaliser - Reserve Pits
- Pit Volume Totaliser – Active and Reserve Pits

Parameter Specifications

- Measuring range 0.4 – 7m
- System accuracy < 0.1% of full scale
- System resolution 1mm



Principle of Operation

Ultrasonic pulses sent out by the transducer are reflected by the mud surface. The receiver translates the time interval between the transmitted signal and its return into an electric current, representing the distance from the transducer head to the mud surface.

Maintenance

Once the system is set up and calibrated, generally no maintenance will be required.

Visual routine checks (daily); remove any obstructions from the field of measurement, change the installation point if the readings are irregular.

Data Processing

The powerful DMS software records, visualizes and displays data on different locations on the well site.

The DMS supports the setting of individual alarms for "High" and "Low" limits for each pit.

Technical Specifications

SENSOR	
▪ Type or model	Pulse echo sensor
▪ Certified for hazardous area	Intrinsically safe to EEx ia IIC T6
▪ Certificate of conformity	PTB No. Ex-97.D.2246
▪ Operating temperature range	-20°C ... +60°C
▪ Supply voltage	24V DC
▪ Installation point	Mounted over the mud pit; avoiding obstructions

Evaluation Unit		
	TRANSMITTER / REPEATER UNIT	Ex-Barrier Amplifier with BUS System
	Isolating amplifier – inputs EEx ia IIC	Barrier Amplifier – EEx ia IIC
▪ Type or model		
▪ Certificate of conformity	BASEEFA No. Ex-90.C.2358X	TÜV 99 ATEX 1499 X
▪ Signal output	4 – 20mA	4 – 20 mA
▪ Supply voltage	24V DC	24 V DC
▪ Bus System:	Not applicable	Field bus independent connectors
▪ Installation point	Logging unit; plugged into 19-inch frame (DMS rack)	



STANDPIPE (PUMP) PRESSURE



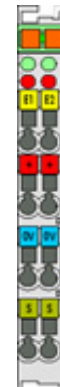
Frequency
Converter



Barrier
Amplifier



Encoder
Interface



Pressure Transmitter for Monitoring Pump Pressure

- High stability
- High accuracy
- High shock and vibration capacity
- Individual types and pressure ranges

Parameter Specifications

- Operating pressure ranges from 0 to 700bar
- System accuracy $\leq 1\%$ of full scale
- System resolution 1bar



Principle of Operation

A diaphragm separates a micro-machined silicon sensor with temperature compensation from the pressure medium. Silicon oil serves as pressure transmitter. An integrated amplifier converts the output test current, which is proportional to the pressure density, into a corresponding DC signal (4 – 20mA).

Maintenance

Once the system is set up and calibrated, generally no maintenance will be required.

Visual routine checks (daily) shall include the observation of possible leaks in the sensor hydraulic system.

Data Processing

The powerful DMS software records, visualizes and displays data on different locations on the well site.

The DMS supports the setting of individual alarms for “High” and “Low” limits.

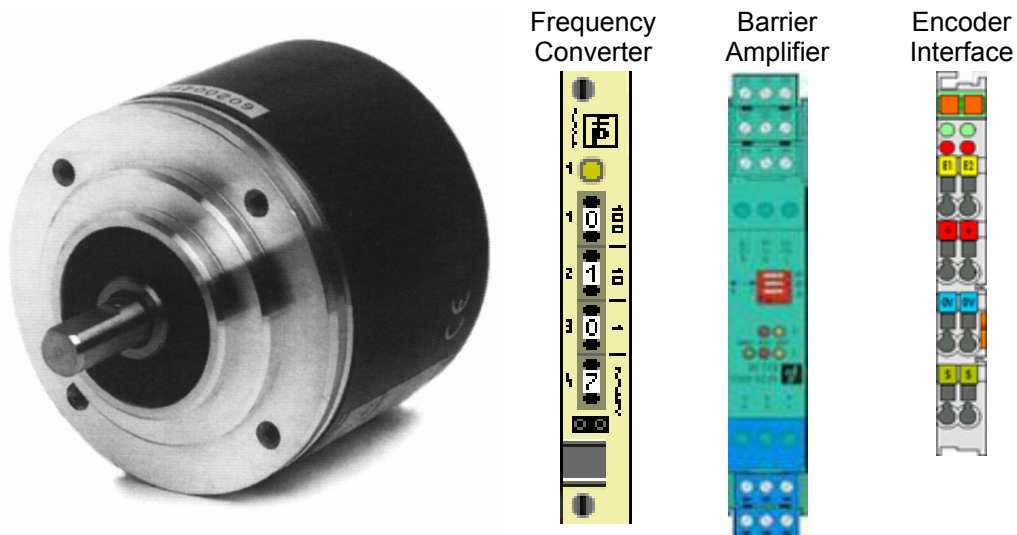
Technical Specifications

SENSOR	
▪ Type or model	Pressure transmitter
▪ Certified for hazardous area	Intrinsically safe to EEx ia IIC T4
▪ Certificate of conformity	BASEEFA No. Ex-89.C.2251
▪ Operating temperature range	-20°C ... +80°C
▪ Supply voltage	24V DC
▪ Installation point	Connected to the load cell of the standpipe pressure indicator (coupling connection e.g. 1/4" NPT HANSEN)

Evaluation Unit		
	Transmitter / Repeater Unit	Ex-Barrier Amplifier with BUS System
▪ Type or model	Isolating amplifier – inputs EEx ia IIC	Barrier Amplifier - EEx ia IIC
▪ Certificate of conformity	BASEEFA No. Ex-90.C.2358X	TÜV 99 ATEX 1499 X
▪ Signal output	4 – 20mA	4 – 20mA
▪ Supply voltage	24V DC	24 V DC
▪ Bus System	Not applicable	Field bus independent connectors
▪ Installation point	Logging unit; plugged into 19-inch frame (DMS rack)	



PUMP STROKES (mechanical)



Incremental Encoder for Counting Pump Strokes

- Pump strokes (pump #1 to n)
- Total pump strokes
- Accumulated pump strokes
- Pump volume (pump #1 to n)
- Total pump volume
- Lag time
- Flow IN

Parameter Specifications

- Measuring range 25 pulses per revolution
- System accuracy – / –
- System resolution 1/25 of a total sensor revolution



Principle of Operation

The rotary encoder is linked to the drive shaft of the pump drive. The pulse disc generates, in correspondence to the pump speed, a sequence of pulses. Inductive proximity switches convert the pulses into proportional electrical signals.

Maintenance

Once the system is set up and calibrated, generally no maintenance will be required.

Visual routine checks (daily); check the sensor positioning weekly, readjust if necessary.

Data Processing

Display, output, recording and storage of the measurements are determined by the Drill Monitoring System developed by GEO-data GmbH.

The DMS allows the setting of individual alarms for "High" and "Low" limits.

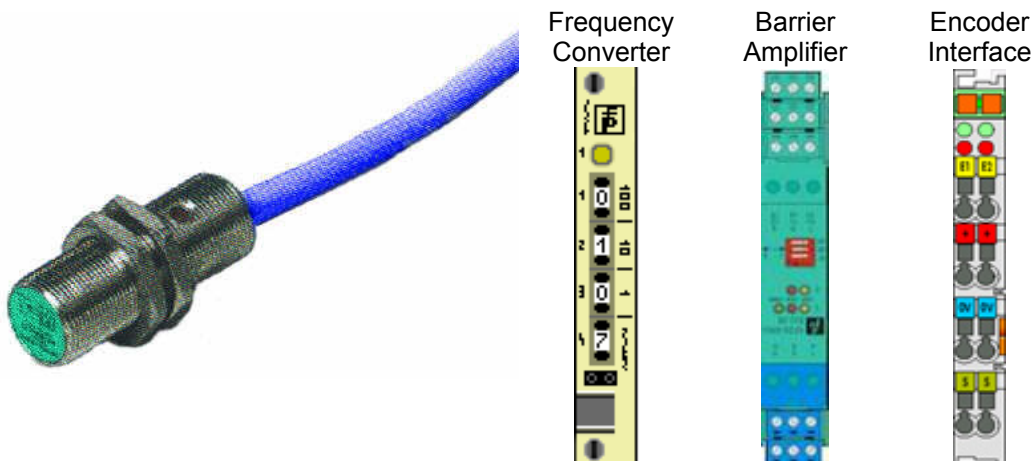
Technical Specifications

SENSOR	
▪ Type or model	Incremental encoder
▪ Certified for hazardous area	Intrinsically safe to EEx ia IIC T6
▪ Certificate of conformity	PTB No. Ex-83/2022X
▪ Operating temperature range	-10°C ... +60°C
▪ Supply voltage	8V DC
▪ Installation point	Linked to the drive shaft of the pump drive

Evaluation Unit	
FREQUENCY / CURRENT CONVERTER	Ex-Barrier Amplifier with BUS System
▪ Type or model	Isolating amplifier – inputs EEx ia IIC Barrier Amplifier EEx ia IIC
▪ Certificate of conformity	PTB No. Ex-81/2065X TÜV 99 ATEX 1499 X
▪ Signal output	4 – 20mA 4 – 20mA
▪ Supply voltage	24V DC 24 V DC
▪ Bus System:	Not applicable Field bus independent connectors
▪ Installation point	Logging unit; plugged into 19-inch frame (DMS rack)



PUMP STROKES (inductive)



Inductive Proximity Switch for Counting Pump Strokes

- Pump strokes (pump #1 to n)
- Total pump strokes
- Accumulated pump strokes
- Pump volume (pump #1 to n)
- Total pump volume
- Lag time
- Flow IN

Parameter Specifications

- Measuring range: Max. 5000 pulses/min
- System accuracy: – / –
- System resolution: 1 pulse (1 stroke)



Principle of Operation

An inductive proximity switch attached to the mud pump is tripped by the action of the piston rod. Each pump stroke produces one pulse, which is registered by the evaluation electronic on time-based intervals.

Maintenance

Once the system is set up and calibrated, generally no maintenance will be required.

Visual routine checks (daily); check the sensor positioning weekly, readjust if necessary.

Data Processing

The powerful DMS software records, visualizes and displays data at different locations on the well site.

The DMS supports the setting of individual alarms for "High" and "Low" limits.

Technical Specifications

- **Type or model**
- **Certified for hazardous area**
- **Certificate of conformity**
- **Operating temperature range**
- **Supply voltage**
- **Installation point**

SENSOR

Inductive proximity switch
Intrinsically safe to EEx ia IIC T6
PTB No. Ex-83/2022X
-25°C ... +100°C
8V DC
At the pump crankcase close to the piston rod

- **Type or model**
- **Certificate of conformity**
- **Signal output**
- **Supply voltage**
- **Bus System:**
- **Installation point**

Frequency / Current Converter

Isolating amplifier – inputs
EEx ia IIC
PTB No. Ex-81/2065X
4 – 20mA
24V DC
Not applicable
Logging unit; plugged into 19-inch frame (DMS rack)

Ex-Barrier Amplifier with BUS System

Barrier Amplifier
EEx ia IIC
TÜV 99 ATEX 1499 X
4 – 20mA
24 V DC
Field bus independent
connectors



MUD FLOW OUT (ultrasonic)



Barrier
Amplifier



Encoder
Interface



Ultrasonic Pulse-Echo Sensor for Monitoring the Fluid Level in Open Flow Lines

- Flow OUT
- Delta flow

Parameter Specifications

- Measuring range 0.5 – 4m
- System accuracy < 0.1% of full scale
- System resolution 1 mm



Principle of Operation

Ultrasonic pulses sent out by the transducer are reflected by the mud surface. The receiver translates the time interval between the transmitted signal and its return into an electric current, which represents the distance from the transducer head to the mud surface. The instrument is calibrated by using a series of fluid levels from pre-defined flow volumes. The measured values are either displayed in fill volume represented by a percentage or litres per minute. The form and shape of the flow-line is non-linear, then this can be compensated for by up to seven calibration values.

Maintenance

Once the system is set up and calibrated, generally no maintenance will be required.

Visual routine checks (several times daily). The sensor mounting should be checked in weekly intervals.

The quality of the measurements depends on a number of factors (sedimentation of cuttings, back flow, etc.), so that the sensor settings must be occasionally readjusted.

Data Processing

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Technical Specifications

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▪ Certificate of conformity	PTB No. Ex-97.D.2246
▪ Operating temperature range	-20°C ... +60°C
▪ Supply voltage	24V DC
▪ Installation point	Mounted over the mud pit; avoiding obstructions

Evaluation Unit		
	TRANSMITTER / REPEATER UNIT	Ex-Barrier Amplifier with BUS System
▪ Type or model	Isolating amplifier – inputs EEx ia IIC	Barrier Amplifier – EEx ia IIC
▪ Certificate of conformity	BASEEFA No. Ex-90.C.2358X	TÜV 99 ATEX 1499 X
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