Sysmetric
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GSET

Pipe Wall Thickness Measurement System

User's Manual

Ver 1.0

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Content

1. **System Description**

GSET is a monitoring & measurement solution, which supports the production of plastic pipes. The GSET systems consists of several GSET Sensors, each is used to monitor and measure a different sector of the pipe perimeter. A complete system allows 360 degrees monitoring and measurement of the pipe wall thickness.

The GSET Sensor is based on using millimetric radio waves, and employing a short Radar technology, to detect the thickness of the near end and far end pipe walls.

The measurement is done in real time and on a continuous basis, while the GSET Sensors are positioned on a dedicated rack, near the pipe production line.

The GSET sensor does not have any physical contact with the measured pipe, therefore the Sensor is agnostic to the pipe temperature.

A typical GSET System includes multiple GSET Sensors, mounted over a dedicated rack, at different angles, pointing towards the center of the pipe.

The GSET Sensors perform and forward the Measurements to a centralized PC which processes the information gathered from all the GSET Sensors, to compose the complete Pipe Measurements view and present it on the screen.

The GSET System includes a 24V DC PS to power the GSET Sensors and an Ethernet Switch to collect and route the Sensors data to the System PC.

2. Functionality

The GSET System is capable of performing the following functions:

A. Measure the thickness of the near end Pipe wall

B. Measure the thickness of the far end Pipe wall

C. 360^{o} Pipe wall thickness

D Measure the Pipe Diameter

E. Measure the Pipe Ovality

The measurements are presented on the PC Screen and collected into a report file, which can be downloaded from the PC and used for QC analysis.

Optional functionality is to communicate the real time measurements from the PC to the PLC which controls the Pipe Production Line, to enable a closed-control-loop for the Pipe production.

Performance:

- Pipe diameter range: from 100mm to 1200mm
- Pipe wall thickness range: from 10mm to 100 mm

3. Operation

The Whole operation of the GSET System is done via the System PC.

The GSET Sensors are powered over the Ethernet cable coming from the Main Switch box.
The main System power switch is located on the Main Switch Box and needs to be Switched-On in order to power up the GSET Sensors.

Switching-Off this Switch will power off all the GSET Sensors.

Except for switch up the power for the GSET Sensors, all other operating action are done by the user from the PC Screen.

Following are Operating instructions for the System PC.

Generally speaking, the PC should be always-on and doesn't have to be turned off.
The PC is powered via a UPS connected directly to the AC mains.
The PC is based on WIN-10.

Logging in to the GSET System PC is as follows:

User Name: GSETxyzt@outlook.com
Password: sysmetric2018

* xyzt stands for GSET system number.

Once logged in activate the GSET app. by clicking the GSET icon on the desktop:

GSET app should be run in Administrator mode .

Do this by clicking on the mouse-right-button – while pointing at the GSET icon:

- "Running as administrator" is mandatory in order to alloew the GSET System to save measurement files on the PC.

3.1 GSET App Operating Guidelines

- Following the activation of the GSET App the GSET Flash screen is presented for 20 seconds.

- Once the Flash screen is off, the MAIN operating screen is displayed.
  (with the RUN and CFG buttons).

- The First Step for a new pipe measurement task, would be now to configure the GSET System, by clicking the CFG button and switch to the CONFIGURATION SCREEN

- In CONFIGURATION screen, the Pipe in production should be selected from the PIPE NAMES menu (top left).

- Once selected need to click the SUMBIT and BACK button, which returns back to the MAIN screen.

- Once in MAIN screen, click the RUN button, and the GSET System is now running and performing the measurement by all GSET Sensors.

4. Maintenance

The GSET System doesn't require any special maintenance procedures.

The GSET Sensors are IP65 compliant devices.

The GSET System Display is a ruggedized IP65 screen.

The GSET System PC is a commercial PC mounted inside the display stand and protected from dust and liquids.

Changes or modifications to this equipment not expressly approved by the party responsible for compliance (Sysmetric Ltd.) could void the user's authority to operate the equipment.

5. Safety

The GSET Sensor uses millimetric wave radio transmission at minimal power, for a very short range. The transmitted max power is -4.5dBm, in the unlicensed range of 57 GHz – 65 GHz. The product complies to FCC 47 CFR part 15 section 15.255
The GSET Sensor powering voltage is DC 24V.

FCC Compliance Statements
This device complies with FCC Rules Part 15. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference.
(2) This device must accept any interference received including interference that may cause undesired operation.
FCC for Class B:

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-- Consult the dealer or an experienced radio/TV technician for help.

WARNING! To comply with FCC RF exposure compliance requirements, the device should be located at a distance of at least 20 cm from all persons during normal operation. The antennas used for this product must not be co-located or operated in conjunction with any other antenna.

6. Specifications

- Sensor FMCW Radio TX/RX frequency: 57 GHz – 65 GHz
- Transmit power: less than 1 mWatt at 3m distance.
- Operation power: Wide range 110/220 V – 50/60 Hz AC power supply
- Sensor size: 58 x 80 x 200 mm
- Monitor & Control PC – Commercial AIO-PC, 24" screen.
- System Chassis size: 1000 x 2000 (for housing 4 sensors, MIDI system)
- Operation and control:
    - Local: 100bT ETH
    - Remote access: 3G/4G
- Operating conditions: Industrial 0 – 60 ^{o} C.
- Humidity compliance: IP65

Performance:

- Pipe diameter range: from 100mm to 1200mm
- Pipe wall thickness range: from 10mm to 100 mm

Compliance:

- This device complies with part 15 of the FCC rules
- FCC ID: 2ATMP-GSET