

HYCONTROL

LEVEL MEASUREMENT SOLUTIONS



MICROFLEX -D ULTRASONIC LEVEL TRANSMITTER

USER MANUAL

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**Thank you for choosing a HYCONTROL instrument.
We are sure that you will be satisfied throughout its use!**

1. INTRODUCTION

Application

The **Microflex-D** from **Hycontrol** is a compact, loop-powered ultrasonic level transmitter for continuous measurement of liquids. Despite the unit being positioned at a budget price-point it does not compromise on quality and provides effortless and intuitive operation. Easy and flexible mounting, combined with high chemical compatibility and a measuring range of 8 metres (or 12 metres in the case of the **ER** model), makes the **Microflex-D** suitable for multiple applications in a wide range of industries.

Operation principle

The **Microflex-D** emits an ultrasonic pulse which is reflected from the surface of the liquid being measured. The reflected signal is processed using specially developed software to enhance the correct signal and reject false echoes. The principle of operation is often referred to as 'time-of-flight'. The time it takes the ultrasonic pulse to travel from and back to the transducer is directly proportional to the distance travelled.

An automatic sensitivity control allows the unit to dynamically adjust and improve the received echoes for the best possible measurement outcome.

2. MODEL TYPES

MICROFLEX-DB – Microflex-D with 2" BSPT thread, 8m (26') range

MICROFLEX-DN – Microflex-D with 2" NPT thread, 8m (26') range

MICROFLEX-DBER – Microflex-D with 2" BSPT thread, extended 12m (40') range

MICROFLEX-DNER – Microflex-D with 2" NPT thread, extended 12m (40') range



A - Removable lid with viewing window

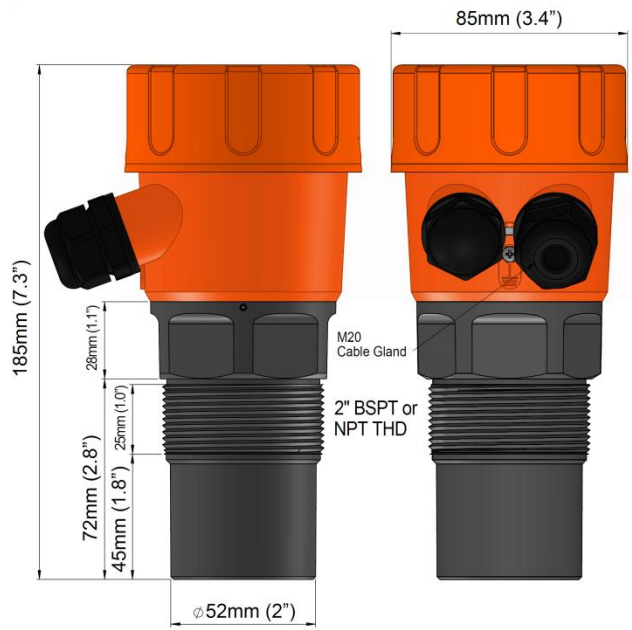
B - Electronics housing

C - M20 cable gland

D – 2" NPT or BSPT thread

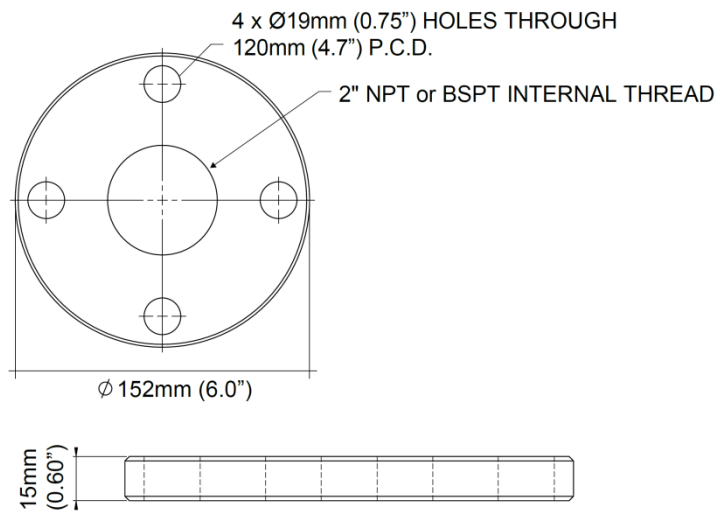
E - Transducer face

3. DIMENSIONS

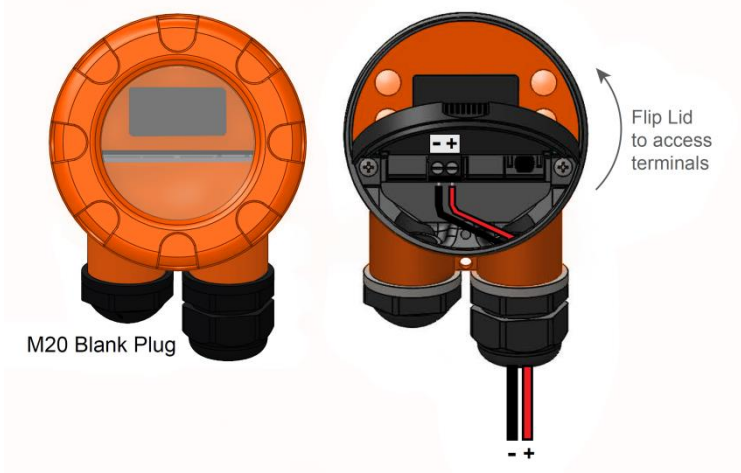


3.1. FLANGE

2" ANSI Polypropylene Flange for NPT threaded units or 2" ANSI Polypropylene Flange for BSPT threaded units



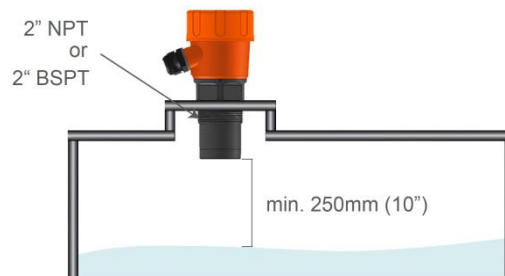
4. WIRING



5. INSTALLATION

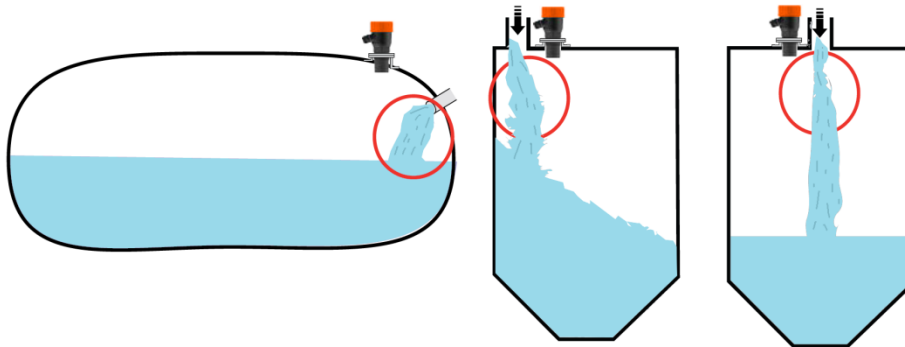
5.1. MOUNTING

- Sensor should be mounted 1/3 the diameter of the vessel from the vessel wall
- Unit should never be closer than 250mm (10") to the liquid surface
- Do not mount over or near objects which can interfere with the unit measurement
- Do not mount in the centre of a curved roof to avoid the potential of parabolic echoes
- Avoid mounting in direct sunlight

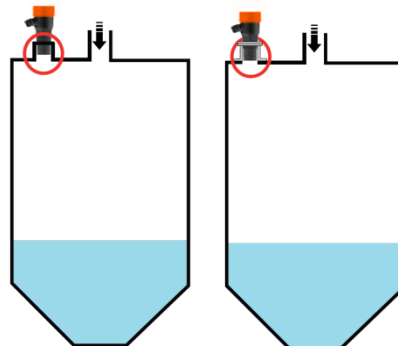


The following are examples of common **INCORRECT** mountings which can prevent the unit from operating correctly:

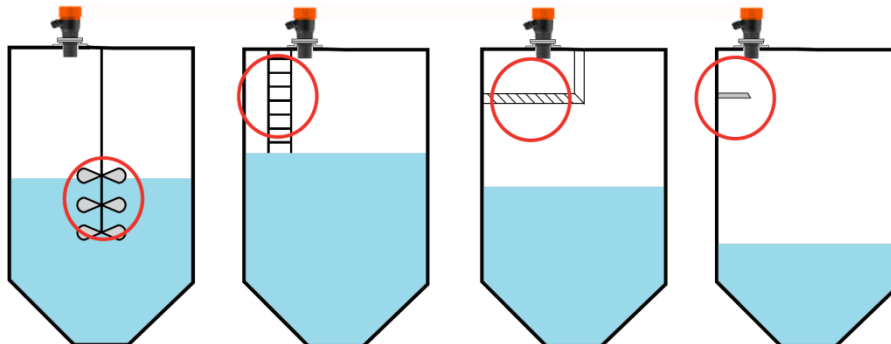
- Do **NOT** mount near infeed



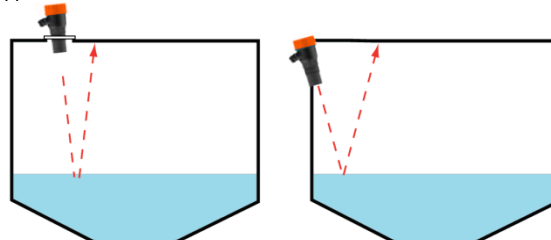
- Do **NOT** mount cone or transducer face above roofline



- Do **NOT** mount over or adjacent to any obstacles



- Do **NOT** mount at an angle in liquid applications



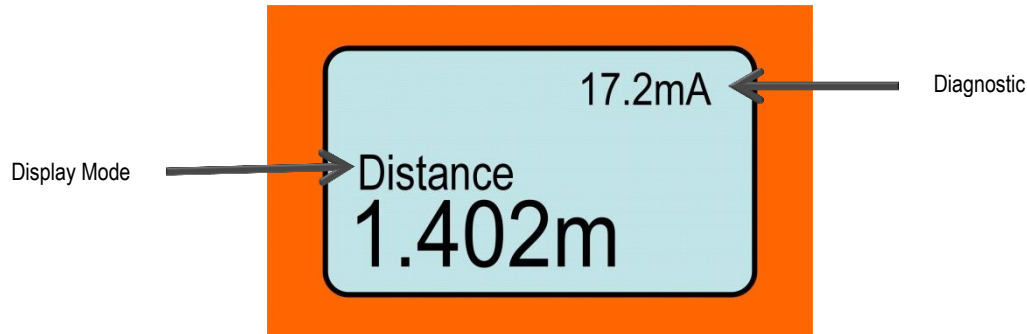
5.2. POWERING THE UNIT

When power is applied, the unit will start up automatically. The LCD will scroll through the boot diagnostics and display the serial numbers, software version and model types for the amplifier and transducer.

The selected Display Mode will be visible with a measurement.

The top right hand corner diagnostic indicates either the operating mode or the current output.

The **Microflex-D** unit will re-scan for the level whenever it is powered up. The image below shows the elements of the standard display:



5.3. INTERFACE

BUTTON	ACTION	NAVIGATION / FUNCTION
CAL	Press and release	Access Main Menu Select / Proceed
	Press and hold for 3 seconds	Access AutoSet Menu
RUN	Press and release	Cancel / Return Re-activate unit
↑ ↓	Press and Release	Scroll between live diagnostics Scroll between menu options Adjust parameters

6. COMMISSIONING – SOFTWARE

Start up the unit. The **Microflex-D** uses automatic sensitivity control to detect and maintain the level. After applying power to the unit allow 20-30 seconds for the unit to adjust to the application.

For best results ensure there is a liquid level present in the application, or a flat surface below the transducer.

6.1. MAIN MENU

To access the Main menu press **CAL**

To access AutoSet menu press **CAL** and hold for 3 seconds

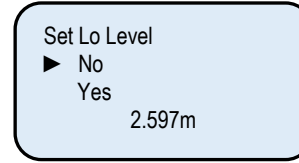
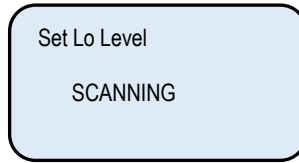
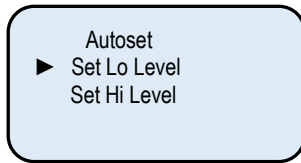
6.2. SETUP

PARAMETER	DESCRIPTION	OPTIONS			
Display Mode	Set LCD measurement display mode	Level	% Level	Distance	Volume*
Display Unit	Adjust displayed measurement unit	CM	Metres	Feet	Inches
Low-Level	Set Low-Level measurement point (4mA)	Adjustable			
High-Level	Set High-Level measurement point (20mA)	Adjustable			
Damping	Adjust output response time & smoothness	Adjustable in seconds			
Failsafe	Set failsafe output	3.50mA 4mA	3.80mA 20mA	20.20mA LastKnown	

* Volume mode requires PC with Vision System II software. Consult Vision System II Manual

6.3. AUTOSET

Use the AutoSet function to scan and program the unit High- or Low-Level to the distance detected. After the scan you will be prompted to accept the distance measured. The High and Low level can also be manually adjusted in 'Setup'.



6.4. ADVANCED SETTINGS

PARAMETER	DESCRIPTION	OPTIONS	
Comms	Comms Adjust HART protocol settings	Device ID Default 1	BaudRate 1200
Blanking	Blanking is a dead-band / non measured range. The unit cannot measure within this range	Adjustable - recommended default 250mm (10")	
Tracking	Adjust tracking response time for application. The faster the tracking, the more responsive the measurement is, but the less smooth the output signal InstaTrack provides pulse by pulse live measurement	Slow Medium Fast InstaTrack	
Mapping	Mapping creates a digital 'map' of false echoes caused by problem mounting and structures. Select 'ExecuteMap' to set a mapped distance, conduct or delete Mapping. Select 'MappedDist' to view a previously mapped distance	MappedDist	
		ExecuteMap	Set Map Dist
EchoSize	The unit will target this echo size (measured in signal voltage) during operation. High values can increase stability but make the unit more susceptible to false echoes. Lower values can make the unit less sensitive and less likely to see false echoes	0.4 - 2.49V Default 0.59V	
Analog	Adjust Analog output. Switch from 4-20mA to 20-4mA and fine tune both 4mA current and 20mA current	4-20mA 20-4mA	Tune 4mA Tune 20mA
Sensitivity	Increase or decrease the unit Automatic Sensitivity Control range. 20 is maximum / highest sensitivity	0: Lowest 10: Default 20: Highest	
WaveBoost	WaveBoost adds additional echo amplification on top of the Automatic Sensitivity Control. WaveBoost should only be used if maximum Sensitivity is not sufficient	0: Lowest (default) 20: Maximum	
Factory Reset	Reset Restore all parameters to factory default	Yes / No	
Device Info	Displays product type, serial number & software revision		
Lock Code	Enable / Disable lock code If enabled, select lock code number	Enable / Disable Default Disabled	1-200

7. HART UNIVERSAL / COMMON PRACTICE COMMAND LIST

The Microflex-D supports the following HART Universal and Common commands:

COMMAND NO.	FUNCTION
0	Read unique identifier
1	Read Primary Variable
2	Read current and percent of range
3	Read current and four predefined dynamic variables
6	Write polling address
7	Read loop configuration
8	Read Dynamic Variable Classifications
11	Read unique ident. associated with tag
12	Read message
13	Read Tag, Description, Date
14	Read PV sensor information
15	Read output information
16	Read final assembly number
17	Write message
18	Write Tag, Description, Date
19	Write final assembly number
20	Read Long Tag
34	Write damping value
35	Write range values
44	Write PV units
57	Read unit tag, descriptor, date
58	Write unit tag, descriptor, date
59	Write number of response preambles
109	Burst mode control

8. TROUBLESHOOTING

Unit is displaying incorrect distance

- Confirm display mode is suitable. **Distance** is measured from sensor face to measured level. **Material** is measured from Low-Level to measured level.
- If unit is measuring too deep increase **Sensitivity**. If the unit continues to measure too deep, increase **WaveBoost**.
- If unit is measuring too high, reduce **Sensitivity** and ensure **WaveBoost** is set to 0.
- Check if material is present to be measured. Unit will output and display FailSafe reading if it cannot detect a level within range.

Analogue trend is erratic/unstable

- Increase **Damping** value for smoother trends.
- Choose a slower **Tracking** speed.
- Check there are no objects interfering with the transit pulse in the application (such as ladders and cross beams).

Unit is locked up or flat line measurement

- Confirm there is material within the measurement range, the unit may go to failsafe if there is no flat level available.
- If the unit is locked to a high level perform **Mapping** for distance beyond false echoes.
- If the unit is locked higher than the real level check for objects interfering with the transit pulse in the application (such as ladders and cross beams). Lower the **Sensitivity/WaveBoost**. Re-locate the installation to avoid the interfering object.
- If the unit is locked lower than the real level confirm the application is not within **Blanking** distance. Increase **Sensitivity/WaveBoost** until the unit measures correct level.
- **Tracking** speed may be too slow for the application. Increase the **Tracking** speed.

PLC indication does not match measurement

- Connect a Multimeter in series with the powered loop. Compare the 'mA' diagnostic on the display with the mA reading on the loop. If these values do not match, disconnect the loop wires and measure the resistance across the loop. This should not exceed specification.
- Confirm **High-Level** and **Low-Level** are set to the same values in MiniWave and control system.

AutoSet fails

- Increase the **Sensitivity** to a higher value.
- Allow the unit to run for a longer time (one minute). Re-attempt the **AutoSet**.
- Increase **WaveBoost** and re-attempt the **AutoSet**.
- Set High- and Low-Level manually in the **Setup** menu.

*If problems persist, install a replacement **Microflex-D** in the application, and bench test the problem unit in a controlled environment. Difficult applications may require the use of different level measurement technology; consult a **Hycontrol** engineer in order to find the most appropriate solution for your requirements.*

9. ACCESSORIES

2" ANSI Polypropylene Flange for NPT threaded units

2" ANSI Polypropylene Flange for BSPT threaded units

*Please consult **Hycontrol** for flange order codes.*

10. SPECIFICATIONS

Frequency

- 50 kHz

Operating Voltage

- 7 - 28VDC at the terminal (residual ripple no greater than 100mV)

Power Consumption

- 500mW @ 24VDC

Analog Output

- 4 -20mA modulating output module with HART (Recommended 250 Ohm @ 24VDC)

Analog Resolution

- 14 bits

Communications

- 4 -20mA with HART

Blanking Distance

- 250 mm (10")

Maximum Range

- 8 metres (26') or 12 metres (40')

Resolution

- 1 mm (0.04")

Electronic Accuracy

- +/- 0.25% of maximum range

Operating Temperature

- -40°C to 60°C (-40°F to 140°F)

Maximum Operating Pressure

- -0.5 to 3 bar (0 - 44 PSI)

Automatic Temperature Compensation

- Yes

Beam Angle

- 7°

Materials

- Transducer: PVDF
- Housing: Powder coated aluminium

Display

- 4-line graphic display (128 x 64)

Keypad

- 4 keys = CAL, RUN, UP, DOWN

Memory

- >10 years data retention

Enclosure Sealing

- IP67

Cable Entries

- M20 cable glands

Mounting

- 2" BSPT Thread or 2" NPT Thread

Typical Weight

- 1kg (2.2 pounds)

Volume

- Pre-set common vessel shapes
- Requires PC connection with Vision System II software
- 32-point programmable linearization table

HYCONTROL reserves the right to change
technical data without notice!