MPI INTERFACE TECHNICAL USERS GUIDE

Introduction

Used as an interface between computers and petrol pumps with different types of tagging. This product was developed by MPI Technology cc because of the difficulty to combine more than one type of pump and or tagging system on the same site with the current pump manufacturers interface equipment. At the time of compiling this document, just over a hundred of these interfaces was installed in the field, over a period of one year.

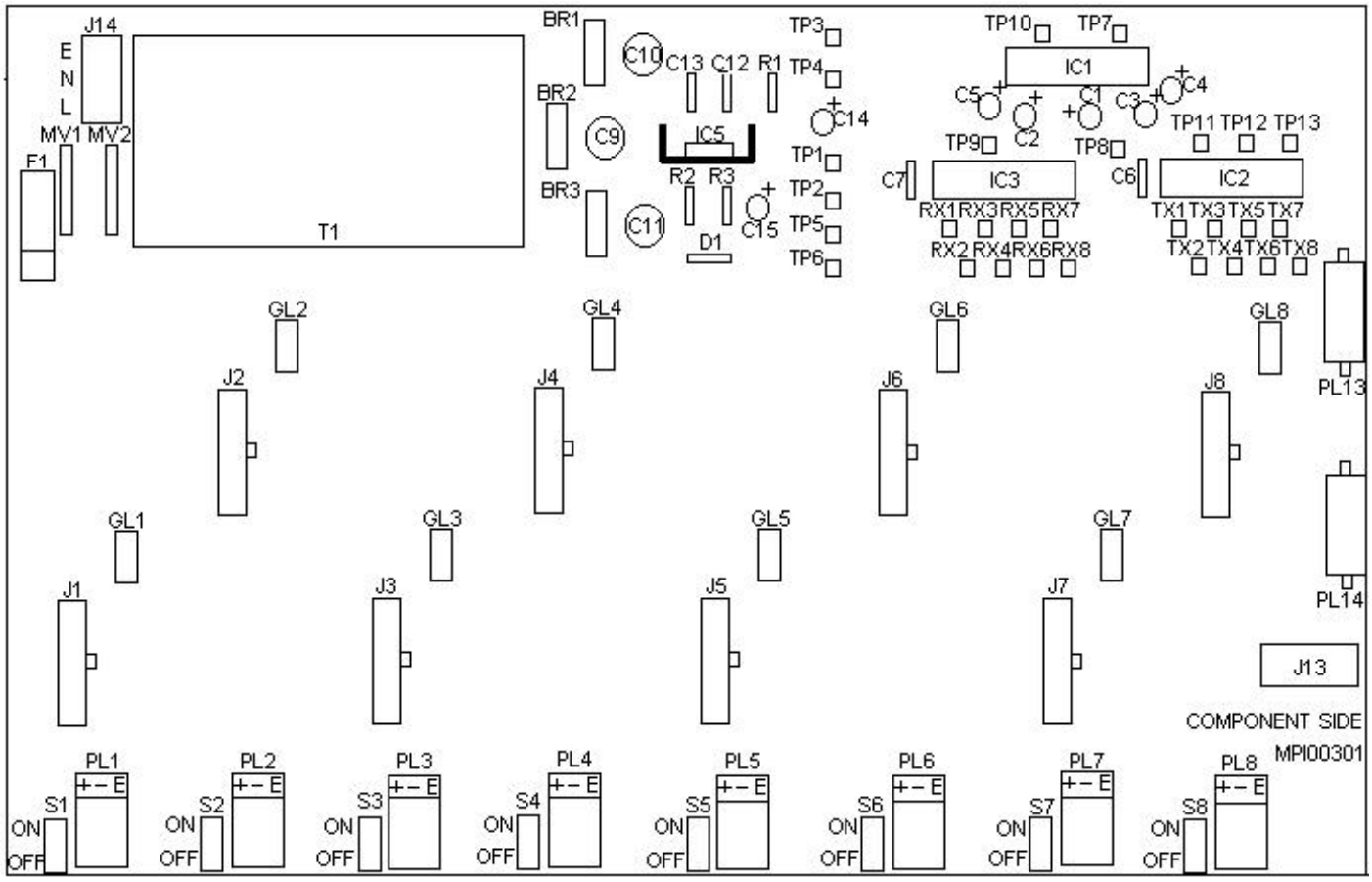
Features

1. Multiple pump protocols can be handled at the same time (i.e.: Dresser Wayne,Gilbarco and Tokheim pumps can work on the same interface simultaneously.)
2. Eight loops are available for pump distribution. If for example one loop goes faulty only the pumps on that specific loop will be effected. The other pumps will continue to function unaffected.
3. If all the eight loops are used, the interface can handle:
   - over 90 Dresser Wayne pumps,
   - over 120 Gilbarco pumps,
   - 24 Tokheim pumps.

   A second interface will be needed in very limited cases.
4. The interface is designed to handle new protocols and hardware easily. (i.e.: cardreader etc)
5. The interface is technician friendly and fault finding can be done with ease.

The MPI Interface

J14 - 220V(AC) connector,
F1 - Fuse,
TP1 to TP6 - To test the power circuit,
TP7up to TP10 - To test data signals from the computer, through the interface, interface modules and pump electronics, back to the computer,
TX1 to TX8 - To test data signals coming from IC2 to the comms modules,
RX1 to RX8 - To test data signals coming from the pump electronics, through the comms modules going into IC3,
PL13 - The serial DB-Connector,
PL14 - The parallel DB-Connector,
J13 - The kick-open connector for a cash drawer,
J1 up to J8 - Where the interface modules plugs in,
GL1 up to GL8 - Jumpers that needs to be set correctly,
PL1 up to PL8 - Where the pumps communication cables connect,
S1 up to S8 - For isolation purposes.
Physical box size: 282 x 243 x 110 (mm)
Weight: 4,1Kg.



The power circuit

220V(AC) go through the 500mA slow blow fuse into the transformer where specific voltages are being tapped and then converted to direct current for the interface usage.
The correct voltages from the power supply circuit can be measured on TP1(test pin 1) up to TP6.
The voltage between TP1 and TP2 is 5V(DC) and is being used to power the IC's.
The voltage between TP3 and TP4 is 47V(DC) and is being used for the current loop circuit.
The voltage between TP5 and TP6 is 26V(DC) and is being used for the cash drawer circuit.

Data signals

Checking data signals makes it easy for technicians to do logical faultfinding.
By means of these data signals it is easy to determine whether it is the computer's communication ports or the interface or the pump electronics that is faulty.
All data checking needs to be done with a logic probe.
The necessary 5V DC for the probe can be tapped from TP1 and TP2.

Error checking / Trouble shooting (using data signals)

Serial port diagnostics

Test to see if the data send by the computer is received on the serial port of the interface and carried through to the pump and back to the computer**.**
Isolate the specific loop by switching the loop switch to the on position.
Table 2 defines the data path and faultfinding sequences the technicians need to follow.

Table2

TEST PIN	**NO DATA PULSES** **POSSIBLE PARTS TO SUSPECT**	**DATA PULSES** **POSSIBLE PARTS TO EXCLUDE**
TP7	Serial Port on PC Faulty Serial Cable from PC Faulty IC1 on Interface Faulty	Serial Port on PC OK Serial Cable from PC OK
TP8	IC1 on Interface Faulty IC2 on Interface Faulty	IC1 on Interface OK
TX1-TX8	IC2 on Interface Faulty Interface Module Faulty	IC2 on Interface OK
RX1-RX8	Interface Module Faulty IC3 on Interface Faulty	Interface Module OK
TP9	IC3 on Interface Faulty IC1 on Interface Faulty	IC3 on Interface OK
TP10	IC1 on Interface Faulty Serial Port on PC Faulty Serial Cable from PC Faulty	IC1 on Interface OK (If Still no comms, check serial port and cable to PC)

Parallel port diagnostics

Test to see if the parallel port is switching the right loop on the interface.
Table 1 defines the logic levels needed on TP11, TP12 and TP13 in order to select the desired loop.

EXAMPLE: To select Loop 2:
TP11=**H**, TP12=**L**, TP13=**L**. Data pulses should be measured on TX2 and RX2.

TABLE1

LOOP	TP11	TP12	TP13	DATA
1	L	L	L	TX1/RX1
2	H	L	L	TX2/RX2
3	L	H	L	TX3/RX3
4	H	H	L	TX4/RX4
5	L	L	H	TX5/RX5
6	H	L	H	TX6/RX6
7	L	H	H	TX7/RX7
8	H	H	H	TX8/RX8

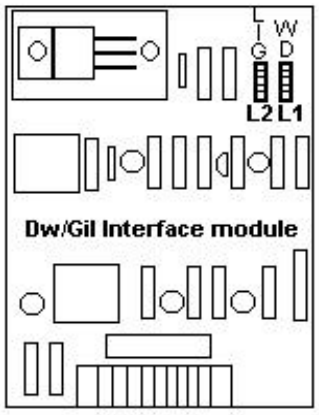
Note: If Data Pulses are only measured on TX pins and not on RX pins, then nothing is received back from the pump and the serial port diagnostics should be followed.

MPI Interface modules

All links from GL1 to GL8 should be in at all times except on positions where interface modules are plugged in.

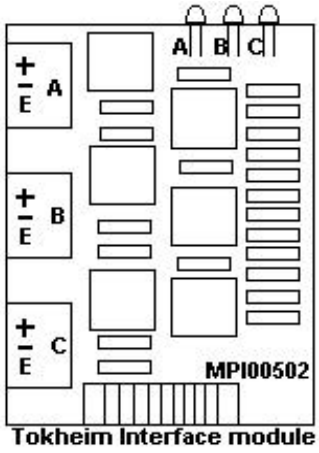
1.GIL/DW Interface module(for Gilbarco and Dresser Wayne pumps)

The module is being used for either Gilbarco or Dresser Wayne pumps.
The choice can be selected by setting a jumper.
If L1(link 1) on the module is set, the module can be used for Dresser Wayne pumps. (30mA Current loop)
If L2(link 2) on the module is set, the module can be used for Gilbarco pumps or MPI Tagging. (40mA Current loop)
Physical size: 65 x 52 (mm)
Weight: 26g.



2.Tokheim Interface module

The module is being used for Tokheim pumps.
The data cables plug in at position A, B and C.
Physical size: 69 x 60 (mm)
Weight: 28g.



Interface cable pin outs

Serial cable pin outs(three core cable)

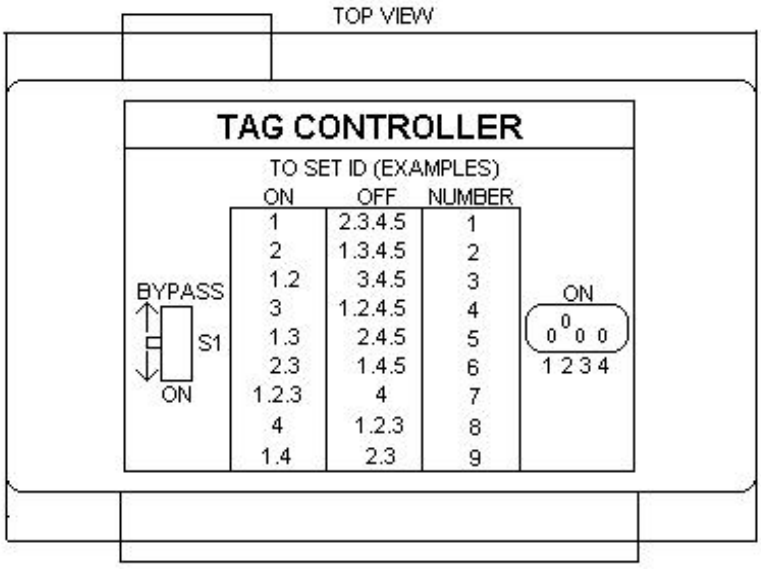
9 Pin Female	9 Pin Male
Pin 2 – Blue	Pin 1 - Red
Pin 3 – Red	Pin 2 - Blue
Pin 5 – Green	Pin 5 - Green
Pin 6 – Pin 7 – Pin 8 (joined)	

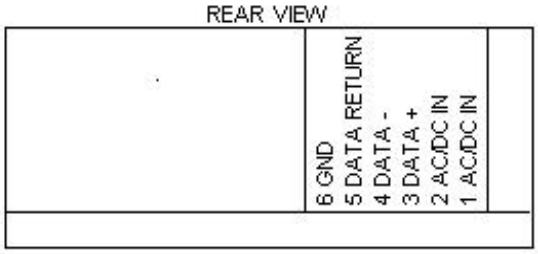
Parallel cable pin outs(six core cable)

25 Pin Male	9 Pin Female
Pin 2 – Red	Pin 1 - Red
Pin 3 – Blue	Pin 2 - Blue
Pin 4 – Yellow	Pin 3 - Yellow
Pin 5 – Green	Pin 4 - Green
Pin 6 – White	Pin 5 - White
Pin 18 – Black	Pin 6 - Black

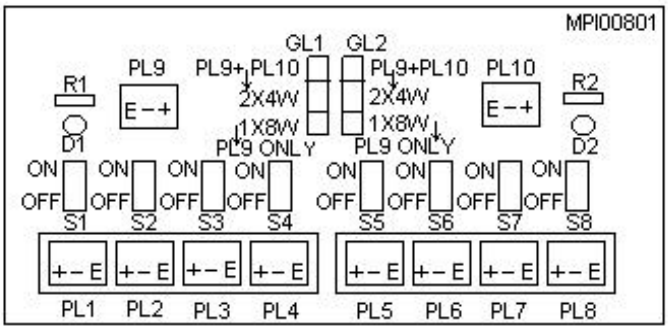
MPI TAGGING

MPI TAG CONTROLLER





MPI ISOLATION MODULE



WIRING USING MPI INTERFACE(REFER TO MPI TAG CONTROLLER REAR VIEW.)
FOR METHOD 1 AND 2 BELOW THE DW/GIL INTERFACE MODULE MUST BE SET FOR GILBARCO(L2) (REFER TO MPI INTERFACE MODULES SECTION.)

METHOD 1 (PREFERRED METHOD)(CABLE RUNNING FROM EACH TAG CONTROLLER UNIT TO COMPUTER)
THE ADVANTAGE OF THIS METHOD IS THAT EACH TAG CONTROLLER CAN BE ISOLATED SEPARATELY FROM INSIDE THE COMPUTER KIOSK USING THE SWITCHES ON THE ISOLATION MODULE.

EXAMPLE

MPI INTERFACE TO **ISOLATION MODULE** (USING AS A SINGLE 8-WAY LOOP)

PL8 +	PL9 +
PL8 -	PL9 -

PL1 UP TO PL7 ON THE MPI INTERFACE CAN BE USED IN THE SAME WAY IF NECESSARY.

ISOLATION MODULE TO **TAG CONTROLLER**

PL1 +	DATA +
PL1 -	DATA -

PL2 UP TO PL8 ON THE ISOLATION MODULE CAN BE USED IN THE SAME WAY AS PL1.

METHOD 2 (SINGLE CABLE RUNNING FROM COMPUTER TO FIRST TAG CONTROLLER AND THEN EACH FOLLOWING CONTROLLER LINKED TO THE NEXT VIA SINGLE CABLE)

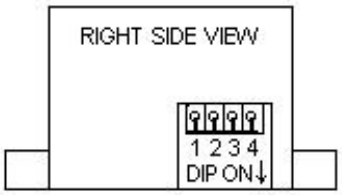
EXAMPLE (USING THREE TAG CONTROLLERS TAKING TAG CONTROLLER NO. 3 AS THE LAST ONE IN THE ROW.)

MPI INTERFACE TO	**CONTROLLER 1** TO	**CONTROLLER 2** TO	**CONTROLLER 3**
1) PL8 +	DATA +		
2)	DATA -	DATA +	
3)		DATA -	DATA +
4)		DATA RETURN	DATA -
5)	DATA RETURN	DATA RETURN	
6) PL8 -	DATA RETURN		

DESCRIBING THE ABOVE EXAMPLE
PL8 + ON THE MPI INTERFACE MUST CONNECT TO THE DATA + OF THE FIRST CONTROLLER.
DATA – OF CONTROLLER1 MUST CONNECT TO THE DATA + OF CONTROLLER2.
DATA – OF CONTROLLER2 MUST CONNECT TO DATA + OF CONTOLLER3.
DATA – OF CONTROLLER3 MUST CONNECT TO DATA RETURN OF CONTROLLER2.
DATA RETURN OF CONTROLLER2 MUST CONNECT TO DATA RETURN OF CONTROLLER1.
DATA RETURN OF CONTROLLER 1 MUST CONNECT TO PL8 – ON THE MPI INTERFACE.

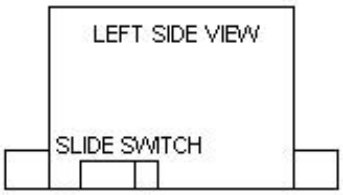
IF WIRING IS CORRECT USING ANY OF THE ABOVE METHODS, 1.3V DC TO 2V DC SHOULD BE MEASURED BETWEEN DATA + AND DATA – PER TAG CONTROLLER.

ID SETTINGS



USE BINARY CODING BY FOLLOWING THE EXAMPLE ON THE TOP VIEW OF THE TAG CONTROLLER.

ISOLATION OF TAG CONTROLLER



IN CASE OF FAILURE THE TAG CONTROLLER CAN BE ISOLATED BY SWITCHING THE SLIDE SWITCH TO THE BYPASS POSITION AS INDICATED ON THE TOP VIEW OF TAG CONTROLLER.
IN NORMAL WORKING OPERATION THE SLIDE SWITCH MUST BE IN THE ON POSITION.

POWER

12V AC OR 18V DC CAN BE CONNECTED ANYWAY AROUND USING POSITION 1 AND 2 INDICATED ON REAR VIEW OF CONTROLLER.

ISOLATION MODULE

THE ISOLATION MODULE CAN BE USED AS A SINGLE 8-WAY LOOP OR TWO SEPARATE 4-WAY LOOPS TO ISOLATE FAULTY POSITIONS OR UNUSED POSITIONS.

SINGLE 8-WAY LOOP
GL1 AND GL2 MUST BE SET TO BOTTOM POSITION.
FOR THIS SELECTION ONLY PL9 AND THE LEFT LED IS USED.

TWO SEPARATE 4-WAY LOOPS
GL1 AND GL2 MUST BE SET TO THE TOP POSITION.
FOR THE FIRST LOOP PL9, LEFT LED AND PL1 TO PL4 IS USED.
FOR THE SECOND LOOP PL10, RIGHT LED AND PL5 TO PL8 IS USED.

TO ISOLATE A SPECIFIC POSITION IN THE LOOP ANY OF THE SWITCHES CAN BE SWITCHED OFF.
UNDER NORMAL OPERATION ALL SWITCHES IN USED POSITIONS MUST BE ON AND IN UNUSED POSITIONS OFF.

IF MORE THAN EIGHT POSITIONS ARE REQUIRED ON THE ISOLATION MODULE TWO OR MORE ISOLATION MODULES CAN BE DAISY CHAINED TOGETHER, THIS CAN BE DONE BY USING EACH ISOLATION MODULE AS A SINGLE 8-WAY LOOP AND WIRING THEM TOGETHER AS FOLLOWS.

EXAMPLE USING TWO ISOLATION MODULES

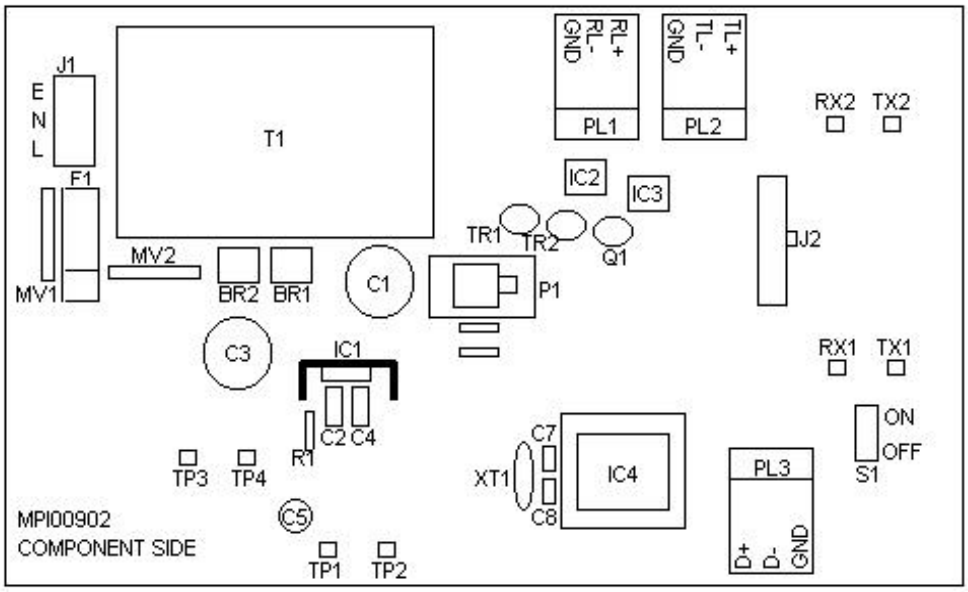
MPI INTERFACE	TO	**ISOLATION MODULE 1**	TO	**ISOLATION MODULE 2**
1) PL8 +		PL9 +		
2)		PL9 -		PL9 +
3) PL8 -				PL9 -

PL1 UP TO PL7 ON THE MPI INTERFACE CAN BE USED IN THE SAME WAY IF NECESSARY.

DESCRIBING THE ABOVE EXAMPLE
PL8 + ON THE MPI INTERFACE MUST CONNECT TO PL9 + ON ISOLATION MODULE 1.
PL9 – ON ISOLATION MODULE 1 MUST CONNECT TO PL9 + ON ISOLATION MODULE 2.
PL9 – ON ISOLATION MODULE 2 MUST CONNECT TO PL8 – ON MPI INTERFACE.

PEC PROTOCOL CONVERTOR

OPERATING VOLTAGE 220V AC USING J1.



WIRING USING PEC PROTOCOL CONVERTOR FOR MPI TAGGING ON PEC SYSTEM

(THE DW/GIL INTERFACE MODULE IN THE PEC PROTOCOL CONVERTER MUST BE SET FOR GILBARCO(L2) (REFER TO MPI INTERFACE MODULES SECTION.)

4-WIRE CURRENT LOOP FROM PEC SYSTEM	TO	**PEC PROTOCOL CONVERTER**
TL +		PL2 (TL +)
TL -		PL2 (TL –)
RL +		PL1 (RL +)
RL -		PL1 (RL –)

PEC PROTOCOL CONVERTER TO **ISOLATION MODULE(**USING AS A SINGLE 8-WAY LOOP)

PL3 (D+)	PL9 +
PL3 (D -)	PL9 -

ISOLATION MODULE TO **TAG CONTROLLER**

PL1 +	DATA +
PL1 -	DATA -

PL2 UP TO PL8 ON THE ISOLATION MODULE CAN BE USED IN THE SAME WAY AS PL1.

SWITCH S1

FOR NORMAL WORKING OPERATION S1 MUST BE IN THE ON POSITION.
IN THE OFF POSITION S1 ACTS AS A ISOLATION SWITCH FOR TEST PURPOSES.