



Title:

SCS FIM module

Document revision:

1

Date:

04 aug 2011

Author:

RZ

Total pages:

13

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Revisions history

Revision	Date	Author	Description
1	04 aug 11	R.Z.	First draft
2	14 may 14	R.Z.	Added FimCFg.txt file example and



2 Abstract

This document is intended as a description of hardware and software facilities of SCS FIM module.

3 Overview

SCS FIM module (Freedom Interface Module) is a hardware device provided with a programmable CPU and several communication interfaces used to integrate SCS Freedom wrenches with customers system, in order to control production flow and achieve tightening traceability.

It's principal characteristics are:

- CPU with customizable software
- Communication with SCS Freedom wrenches via Bluetooth or Rs232 interface Protocol
- Communication with external Host to receive commands for wrenches and send results via rs232 or Ethernet or I/O
- 2 serial ports
- Ethernet
- File system for storing application, configurations and results
- 64Kb memory to store tightening results (2000 results)
- 8 24V input lines
- 8 24V output lines

4 Communication between FIM and Wrenches

FIM can communicate with SCS wrenches by one of the following media:

- Bluetooth, using a BT to Rs232 module
- Rs232 direct, when using cabled wrenches
- 868MHz Radio

An advanced communication protocol allows FIM to control a wide range of parameters allowing to control the wrench operations in real-time and to retrieve production results.

In most cases this protocol is too complicate to be implemented by customer's application system this is the reason why FIM can be interposed between wrenches and customer's system.

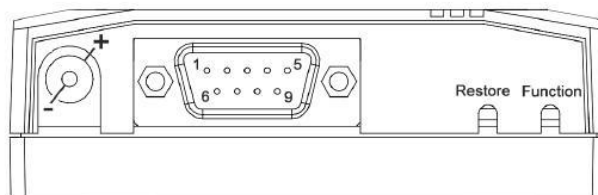
4.1 BT interface module

When using BT communicating wrenches a Bluetooth interface module must be used together with FIM. This is normally provided by SCS. Following is Bluetooth connection description

2.2.2 Power Supply

If you are not using the power adapter provided with the product or if there is none provided you must use a DC plug 2,1 mm centerpin (-) connector.

The product shall have a power supply of 5 VDC, min 200 mA on the power connector.



Picture 5. DC plug 2,1 mm centerpin (-) and 9-pin DSUB male.

2.2.3 RS232

RS232 male 9-pin DSUB:

- Pin 1: NC, not connected
- Pin 2: RD, input, receive data
- Pin 3: TD, output, transmit data



5 Communication between FIM and customer system

FIM can be interfaced to customer system in different ways, according the type of desired communication a different application firmware should be installed in SCS FIM module, see later chapter [SCS standard FIM firmwares](#)

1. 24V I/O
2. Rs232
3. Ethernet UDP messages

5.1 24V I/O

When using I/O a PLC or PC can use 24V I/O lines to:

- Select tightening programs formerly loaded to wrench using SCS SQNet windows application
- Enable/disable wrench
- Retrieve information on the status of the work cycle

6 SCS standard FIM firmwares

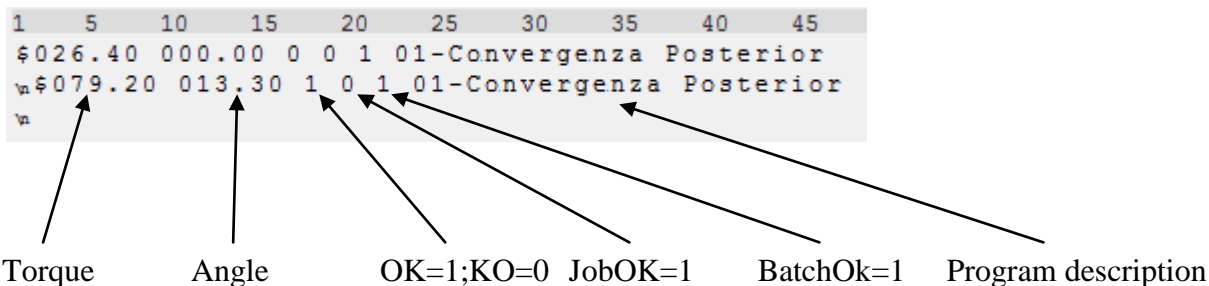
Two standard firmwares can be preloaded to FIM module by SCS according to the type of application

6.1 FIM generic application with 5 Input

This application allows to:

1. Manage one single wrench
2. Enable/disable the wrench via 24V I/O
3. Select tightening program or job to activate
4. Receive the tightening or job status via FIM 24V outputs
5. Receive tightening torque and angle result via RS232 or UDP messages
6. Print tightening or job report on serial Micronic Star printer or similar
7. Receive and store scanned part number string on Rs232
8. Enable wrench after scan or print (when no I/O are used for enabling)
9. Save up to 2000 result to be uploaded to SCS SQNet software

6.1.1 Rs232/UDP result telegram format:



6.2 Software functions configuration

Programmable I/O function and function enabling (print, scan...) can be made via a ini file (FimCfg.txt) to be copied into FIM file system during installation.

6.2.1 Configuration file example

See comments in red in following ini file sample for configurations short description:

```

;--- SystemName (name for BT server)
SYSTEMNAME=STATION_01
;--- Language 1=Italian,2=english,3=german,4=french,5=spanish,6=portuguese,7=polacco
LANGUAGE=1
;--- SaveResults If results must be save to file (0=no,1=yes)
SAVERESULTS=0
;--- Host Rs232 Serial communication enable to send result (0=disable, 1=enable)
HOSTRS232EN=0
;--- HostCommPort: The serial port to communicate with the host (EXT=0,COM=1)
HOSTCOMMPORT=0
;--- HostSerialSpeed: Speed of he serial port used to communicate with the host
HOSTR232SPEED=9600
;--- Host UDP communication enable (0=disable, 1=enable)

```



```

HOSTUDPEN=0
;--- HostAddress: The host IP address
HOSTADDRESS=192.168.10.210
;--- HostUDPPort: The host UDP port to receive results
HOSTUDPPORT=1970
;--- WrenchCommType: 1=BT, 2=RS232, 3=USB, 4=RADIO 868
WRENCHCOMMTYPE=1
;--- WrenchCommPort: The serial port to communicate with the wrench (EXT=0,COM=1)
WRENCHCOMMPORT=1
;--- Flag to set the wrenches in fully slave mode, possible values: 0 = No Slave, 1 = Disable at power up, 2 = Fully
;--- Slave, 5= Fully Slave No Skip
WRENCHFULLYSLAVE=0
;--- Flag to enable the use of input 6 to enable/disable wrench
USEENABLEINPUT=0
;--- Prog selection mode 0=inputs select Job, 1=inputs select Program, 2=selection by hand by user(no remote
selection)
PROG_SEL_MODE=1
;--- Cycle ResetEvent: When cycle must be reset: -1 = never,11=Input 1 ON, 12=Input 2 ON, 13=Input 3 ON,
;--- 14 = Input 4 ON, 15= Input 5 ON,21=Input 1 OFF,22=Input 2 OFF,23=Input 3 OFF,24 = Input 4 OFF,
;--- 15= Input 5 OFF
CYCLERESETEVENT=-1
;--- Star Print Enable
STARPRINT=1
;--- PrintCommPort: The serial port to print
PRINTCOMMPORT=0
;--- PrintSerialSpeed: Speed of the serial port used to print
PRINTR232SPEED=9600
;--- PrintEvent: When label must be printed: 0=Batch complete,1=Job Complete,11=Input 1 ON, 12=Input 2 ON,
;--- 13=Input 3 ON, 14 = Input 4 ON, 15= Input 5 ON,21=Input 1 OFF,22=Input 2 OFF,23=Input 3 OFF,
;--- 24 = Input 4 OFF,15= Input 5 OFF...
PRINTEVENT=1
;--- RePrintEvent: When lable must be reprinted: -1 = never,11=Input 1 ON, 12=Input 2 ON, 13=Input 3 ON,
;--- 14 =Input 4 ON, 15= Input 5 ON, 21=Input 1 OFF,22=Input 2 OFF,23=Input 3 OFF, 24 = Input 4 OFF,
;--- 15= Input 5 OFF....
REPRINTEVENT=16
;--- ResultHeader1 First line of print lable header
RESULTHEADER1=FIAT Auto Stab. di Tychy
;--- ResultHeader2 Second line of print lable header
RESULTHEADER2=Modello 846 Pilotino
;--- LineFeedAtEnd: number of line feeds at end of report printing
LINEFEEDATEND=7
;--- Scan input Enable (scanner)
SCAN=0
;--- ScanCommPort: The serial port to receive scanned string (VIN)
SCANCOMMPORT=0
;--- ScanSerialSpeed: Speed of he serial port to receive scanned string (VIN)
SCANR232SPEED=9600
;--- ScanEndChar: Scanner string end char ASCII code (13 = <CR>; 10 = <LF> ..., > 255 = none always ends by
;--- timeout )
SCANENDCHAR=13
;--- ScanLable: Lable to print before scanned number
SCANLABLE=CIS:
;--- ResetScanAfterPrint: If Scanned string must be rest after printing lable
RESET_SCAN_AFTER_PRINT=1
;--- If Multidrop function must be enabled for Connectnlue BT module
BT_MULTIDROP=0

```



```

;--- Verbosity level
VERBOSE=2
;--- If batch counter must be always reset when a program is selected
ALWAYSRESETBATCH=0
;--- If Date/Time must be taken from results received from Wrenches
GETDATEFROMWRRESULT=0
;--- If VIN must be taken from results received from Wrenches
GETVINFROMWRRESULT=1
;--- Print only last program results when a Job is executed (used for multi step program implementation)
PRINTONLYLASTPRGINJOB=1
;--- If Ready output is connected to wrench ready or to wrench online (1=Wrench ready, 2=wrench online)
READYOUTMODE=1;
;--- If Ready shrunked label must be printed without printing header for each program (FIAT Termini)
; Set to 1 for Fiat Termini
SHRINKLABEL=1;
;--- DisableEvent: When wrench must be disabled (except using USEENABLEINPUT) bitmask: 0 = never,1 = After Print,
;--- 2 = After scan 4...
; Set to 1 for Fiat Termini
DISABLEEVENT=1
;--- EnableEvent: When wrench must be enabled (except using USEENABLEINPUT) bitmask: 0 = never,1 = After Print,
;--- 2 = After scan 4...
; Set to 2 for Fiat Termini
ENABLEEVENT=2

```

6.2.2 Installing application executable and configuration files

SCS FIM module is provided with an FTP server.

A standard FTP client application for windows such as FTPcommander can be used to copy executable files and FIMCfg.txt file to the module file system. Access to the FTP server using following username and password

Username : ftp

Password: ftp

6.2.3 Viewing FIM application debug output

Applications running on FIM applications normally output debug and information messages on the video standard output, since no display is normally connected to FIM it is possible to display those messages on a PC using a remote console application such as telnet.

This is particularly useful to understand if the system is working properly.

To do this follow this procedure:

1. Connect a crossed ethernet cable between PC and FIM RJ45 connector
2. Set PC IP to an IP compatible with FIM's IP (ex.: FIM IP= 192.168.10.200, PC IP= 192.168.10.201)
3. Start windows command prompt on PC (cmd.exe)
4. Type telnet FIM IP on DOS shell of the PC (ex.: telnet 192.168.10.200)
5. Enter username tel and password tel
6. Messages similar to the ones in the following figures should be displayed


```

C:\> Prompt dei comandi

C:\Documents and Settings>telnet 192.168.10.200

```

Before any wrench is connected:

```

Telnet 192.168.0.2

SC13 Telnet session

Username: tel
Password: ***
User logged in
SCS FIM GEN Version 3.27
Error initializing BT module on COM1...
SCS FIM GEN Version 3.27
Error initializing BT module on COM1...
SCS FIM GEN Version 3.27
Error initializing BT module on COM1...
BT module succesfully initialized on COM1...
SCS FIM GEN Version 3.27
0
48@

```

When a wrench is successfully connected:

```

Telnet 192.168.0.2

SCS FTA - RX: $120008000000014000010=0;11=S0030B710194;15=PRW U2.2.28;16= 30.00;17=1;18=01;19=PLX00301000BT;20=65;1530
SCS FTA - TX: $1200038000100012020110=1;11=SCS_0001;13=2;14=S0030B710194;0C3B
=====
SCS FIM GEN Version 3.27
WRENCH ON LINE - S0030B710194
PRW U2.2.28
=====
Setting Slave mode to 0
SCS FTA - TX: $120005000200402020112=0;04DE
SCS FTA - RX: $1240050001000200102000110=0;059C
SCS FTA - TX: $1200000000301062020103D2
SCS FTA - RX: $120006000200402010216=-1;0511
SCS FTA - TX: $1240050004000200201000210=0;05A0
16=-1;0511
SCS FTA - RX: $1240050003000200102000210=0;059F
SCS FTA - RX: $1240050004000200102000310=0;05A1
SCS FTA - TX: $120000000503002020103D0

Received Ack to Slave mode 2SCS FTA - TX: $120000000600052020103D3
SCS FTA - RX: $1240050005000200102000510=0;05A4
SCS FTA - RX: $1240050006000200102000610=0;05A6
10=0;11=S0030B710194;15=PRW U2.2.28;16= 30.00;17=1;18=01;19=PLX00301000BT;20=65;1530
=====
Request to activate Prog nr. 0
Request to disable wrench
SCS FTA - TX: $120000000700062020103D5
SCS FTA - RX: $1200047000700032010210=S0030B710194;11= 30.00;12=PRW U2.2.28;20=64;0DE7
SCS FTA - TX: $1240050008000200201000710=0;05A9
10=S0030B710194;11= 30.00;12=PRW U2.2.28;20=64;0DE7
SCS FTA - RX: $1240050008000200102000710=0;05A9
SCS FTA - RX: $1200047000900032010210=S0030B710194;11= 30.00;12=PRW U2.2.28;20=65;0DEA
SCS FTA - TX: $1240050009000200201000910=0;05AC
10=S0030B710194;11= 30.00;12=PRW U2.2.28;20=65;0DEA
=====
Output: 0X0
Prog: 0
Ready: 0
T OK : 0
T KO : 0
Batch complete: 0
Job complete: 0
SCS FTA - RX: $1200047001000032010210=S0030B710194;11= 30.00;12=PRW U2.2.28;20=65;0DE2
SCS FTA - TX: $1240050010000200201001010=0;059C
10=S0030B710194;11= 30.00;12=PRW U2.2.28;20=65;0DE2
512@

```

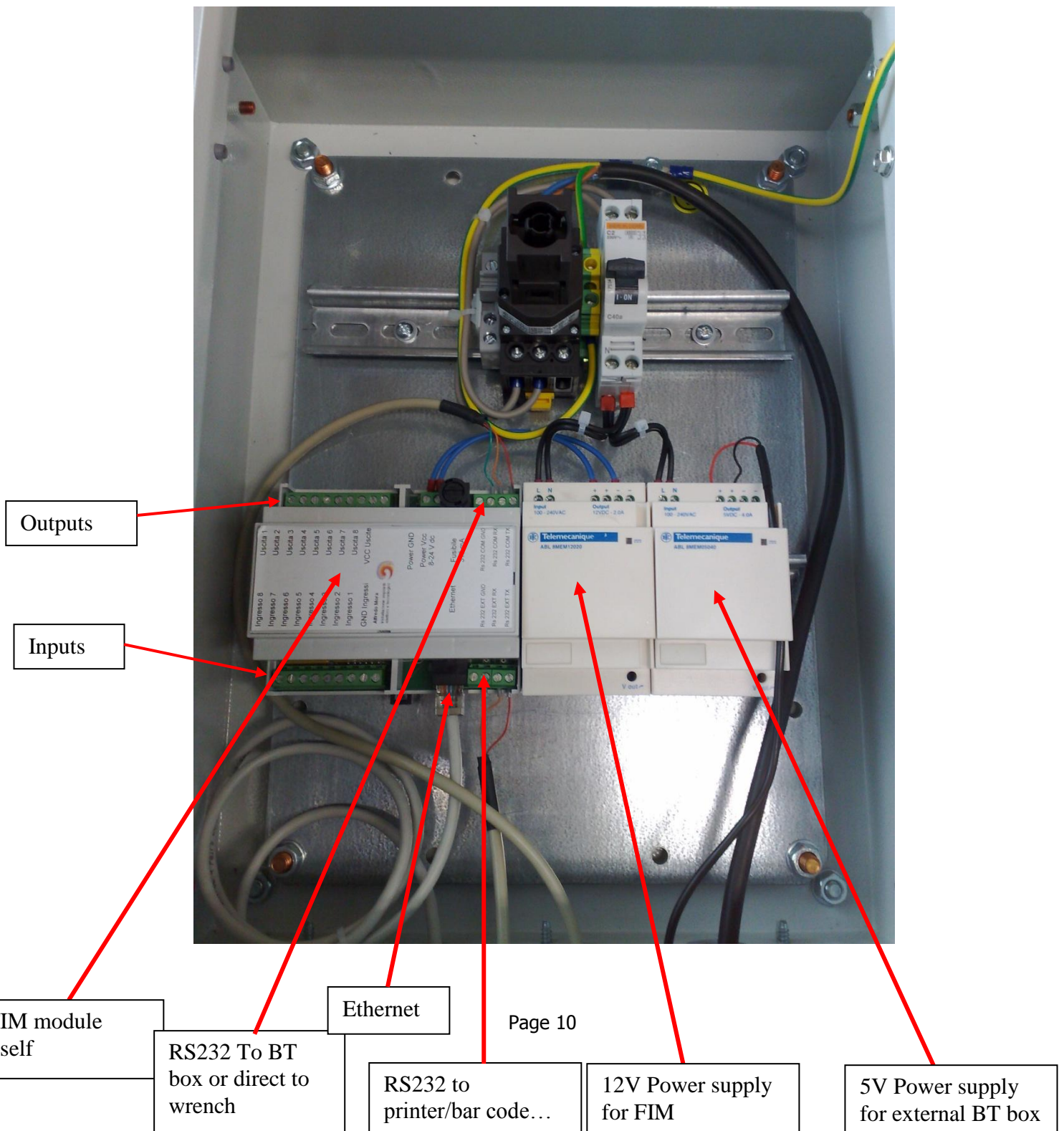
6.3 FIM RS232/UDP server

This is a simple RS232 or UDP interface that using a simple ASCII protocol allows to do the following

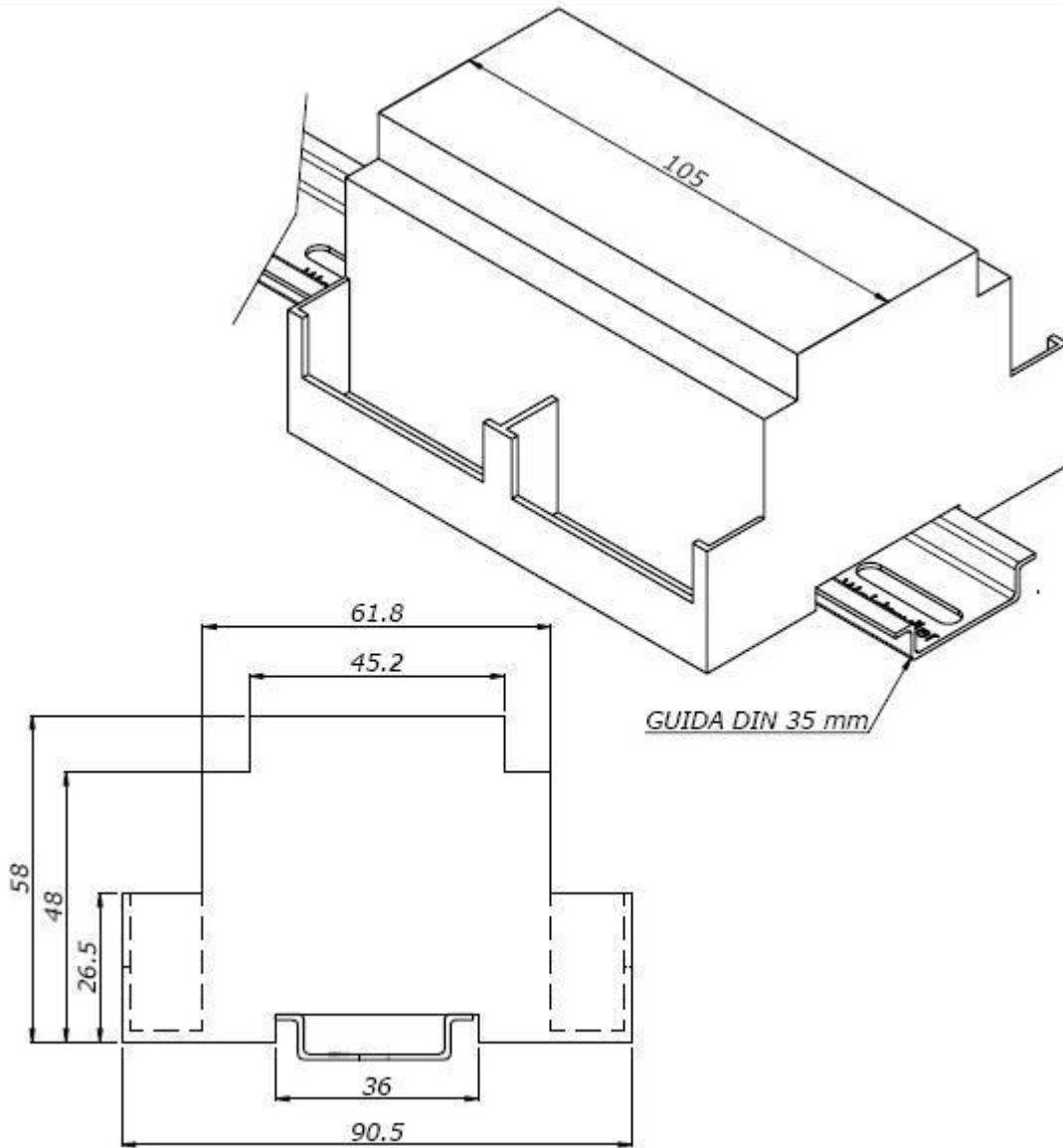
1. Enable/disable the wrench via
2. Select tightening program activate
3. Receive tightening torque and angle result

7 Installation

A typical FIM installation can be as follows:

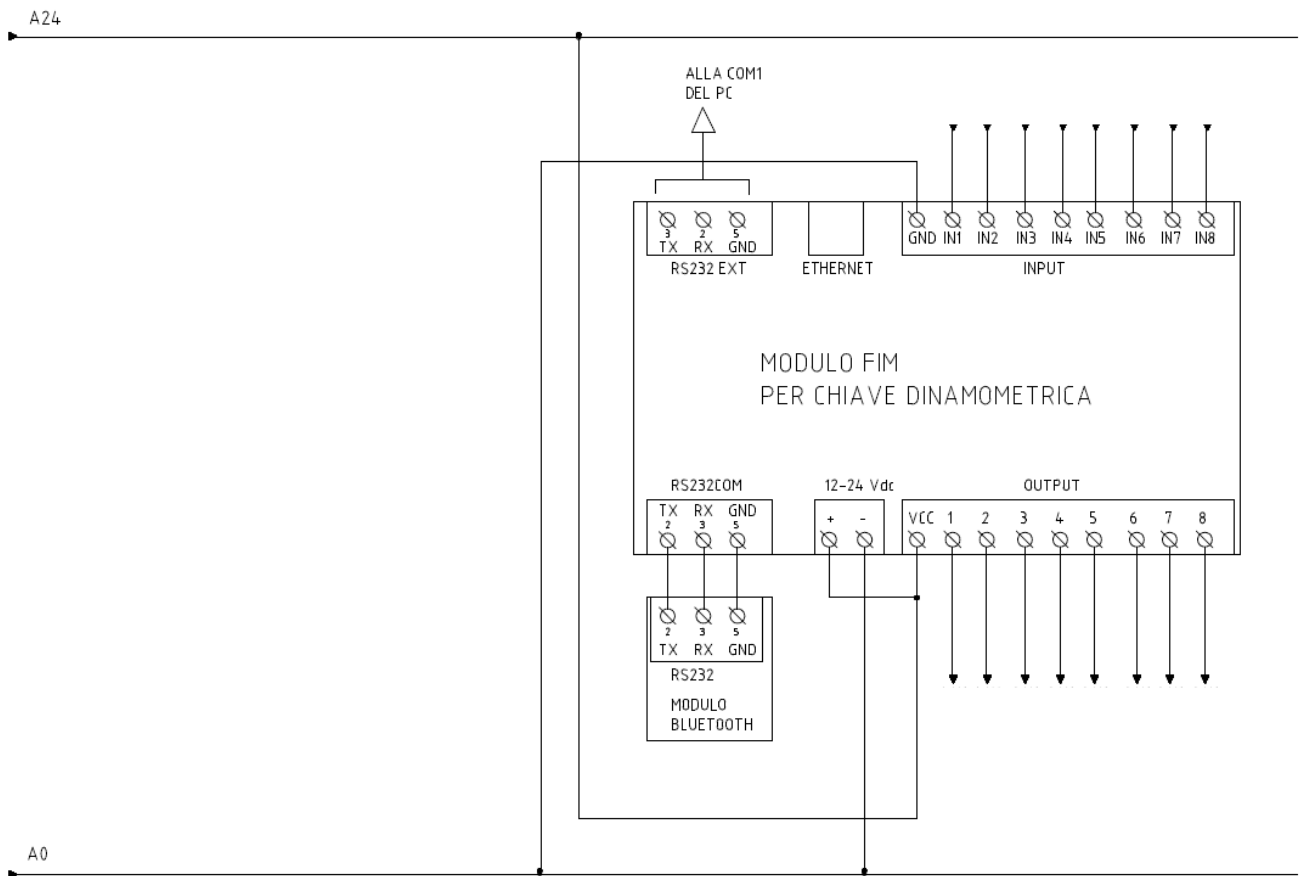


7.1 Module Dimensions



7.2 Connections

The following schema shows FIM modules connections



7.2.1 Inputs:

IN1	IN2	IN3	IN4	IN5	IN6	IN7	IN8	Function
Program Selection					Enable	Gen. purpose		
0	0	0	0	0				No program or job selected
1	0	0	0	0				Program or job 1 selected
0	1	0	0	0				Program or job 2 selected
1	1	0	0	0				Program or job 3 selected
1	1	1	1	1				Program or job 32 selected
x	x	x	x	x	0			If FIM is configured to use enable bit the wrench stay disabled even if a program is selected
x	x	x	x	x	1			If FIM is configured to use enable bit, the wrench is enabled

7.2.2 Outputs

O1	O2	O3	O4	O5	O6	O7	O8
Bit 1-3 of selected program			Wrench ready	Latest test OK	Latest test KO	JOB complete	BATCH complete

7.2.3 Serial cable to host

Connection to external host system is a typical NULL modem connection where Tx and Rx wires must be crossed:

