MCIH

UNIVERSAL INPUT PROGRAMMABLE TOTALISER

Cerebrum Series

Smart Tot Σ

FEATURES

- Universal Inputs - mA, Volt, pulse .
- Dual Six digit 8 mm LED displays.
- Accepts auxiliary process inputs.
- Universal retransmission output.
- Battery backed totaliser counters.
- Alarms for Flow rate and Counter.
- Fully front panel programmable.
- Tamper proof Software Calibration.
- Set of Powerful Software Modules.
- Wide supply tolerance - 90 to 270V.

About *Smart Tot Σ* . . . .

Smart Tot Σ the universal input programmable Totaliser is a constituent of the **cerebrum** series of smart instruments from MCIH. With a microcontroller based hardware structure, Smart Tot can process either DC signals from DP / Flow transmitters or pulse signals from turbine flow meters. All functional and computational requirement for flow instrumentation are fulfilled by the software modules of Smart Tot. The instrument offers dual six digit LED display, an isolated software configurable current or voltage retransmission output, two alarm contacts, and transmitter power supply. The totaliser contents of smart tot are retained during power failure by an inbuilt Ni-cd battery.

Smart Tot even accepts an auxiliary signal input representing process related parameters like line pressure, level density etc., and indicates it. Smart Tot can be powered by either of the power line standards 110 V or 220 V AC.

Smart Tot Σ the ultimate in flexibility ...

The Smart Tot has powerful functional and mathematical software modules with special features demanded by flow instrumentation applications. Ranging in terms of engineering units, square rooting, resolution setting for turbine transmitter signals, alarm on totalised count and count rate setting for Totaliser are a few of the many software capabilities of Smart Tot that give a new dimension to the adaptability of the instrument for diversified applications. Industry standard flow applications are supported readily with preprogrammed templates to save the programming time.

From programming through reconfiguration to calibration, Smart Tot eliminates access to internal hardware, which means increased operational reliability, reduced setup time during installation and easy maintenance.

PERFORMANCE SPECIFICATIONS

POWER SUPPLY

90 to 270V AC / 50-60 Hz; Can work with any of the following power lines.

a. 220V b. 230V c. 240V d. 110V

INPUT : Primary & Auxiliary (Channels 1 & 2)

Filter : User configurable Digital filter.

Impedance : 470KΩmin. for Voltage inputs. 6Ω max. for mA inputs.

Tx - Powering : Two two-wire Transmitters can be powered. Short circuit protected to prevent loop burn out.

Calibration : By Software through keypad. No screw driver adjustments or hardware access required.

Basic Ranges[1]

Type	Range	Limits	Accuracy % FS
V1	0 to ±2 V	±40V	±0.25
V2	0 to ±10 V	±40V	±0.1
mA1	0 to ±4 mA	±40mA	±0.25
mA2	0 to ±20 mA	±40mA	±0.1

Note 1: User can define any range confined within the limits of the Basic range. However Accuracies refer to the Full Scale of Basic Range.

INPUT : Pulse

Sensitivity : 3 Volts (peak) minimum.

Isolation : Opto isolated from Analog inputs and output.

Type	Range	Limits	Accuracy % FS
Pulse[2]	0.13 to 10,000Hz	± 24V	± 0.1

Note 2: Conditioned pulse inputs are only accepted. Eg. Outputs of Pulse Amplifiers, Turbine Flow Transmitters etc.

TOTALISER MODULES

Backup : On-line charged Ni-Cd battery backed Totaliser counters.

Reset : Can be reset from front panel.

Pulse Totaliser (PTOT)

Scaling : Totalised Engg. unit / pulse(s) is software configurable

Analog Input Totaliser (TOT1)

Resolution : Configurable upto three decimals.

DISPLAY

Type : Dual - 6 digit / 8 mm LED display

Range : -1999 to 999999.

Resolution : one LSD.

Temporary Display : Up to two variables can be viewed (Choice by software)

RETRANSMISSION OUTPUT

Type : 0 - 20mA / 4 - 20mA / 1 - 5V / 0 - 10V software Configurable.

Accuracy : ± 0.1% of 20mA / 10V - refers to output module only.

Load : mA output - 600 Ω maximum. Voltage output - 10 KΩ minimum.

Isolation : Optical isolation - 600 V DC or AC peak.

ALARMS

Type : Hi / Lo / Deviation / Count.

Setting : Can be set directly in engineering units or in % by software.

Hysteresis : Software setable.

Indication : By front panel LEDs.

Output : Three potential free change over change over contacts rated for 220V AC/DC 1 AMP (non inductive).

GENERAL SPECIFICATIONS

DIMENSIONS

Bezel : 96 mm x 96 mm

Cutout : 92 + 0.8 mm x 92 + 0.8 mm
- 0.0 - 0.0

Depth : 175 mm

Mounting : Flush Panel

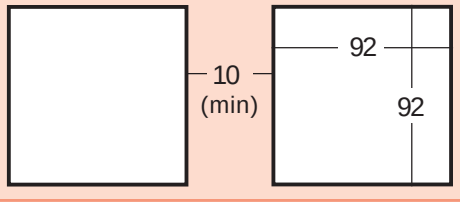
ENVIRONMENT

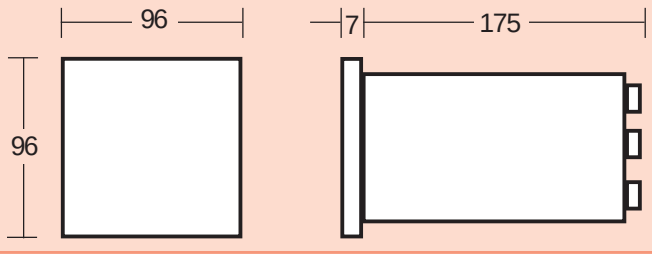
Operating Temperature : 0 to 55 °C

Storage Temperature : 0 to 70 °C

Humidity : 0 to 90 % (Non Condensing)

CUTOUT DETAILS (All Dimensions are in mm)





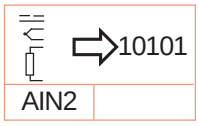
Specifications are subject to change without any notice due to continuous development.

SOFTWARE MODULES

Programming Smart Tot involves interconnection of software modules suitably to achieve desired functions, display and output. A flow chart can be obtained using the modules to fulfill any given requirement and can be implemented into Smart Tot through the front panel key board. The software modules are broadly classified according to their position in flow chart as illustrated below.

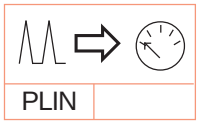
LEFT END MODULES :

Hard wired Input and Soft wired Output



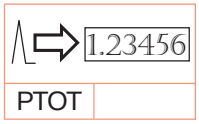
Analog Input Modules - 2

Condition analog inputs like mA, Volts, in to 0-100% software output.



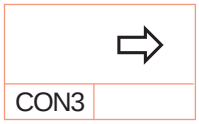
Pulse to Linear Module - 1

Accepts pulse input from Turbine flow meters and converts it into rate of flow output (in engineering units).



Pulse Totaliser Module - 1

Accepts pulse input from Turbine flow meters and totalises them to give quantized output in engg. units.

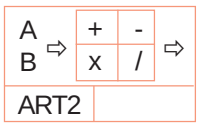


Constant Modules - 3

Constant Modules hold user Programmed constants and output them to other linked modules.

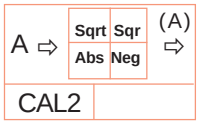
MIDDLE MODULES :

Soft wired Input and Soft wired Output



Arithmetic Modules - 2

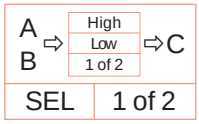
Addition	: C1xA + C2xB + C3
Subtraction	: C1xA - C2xB - C3
Averaging	: (C1xA+ C2xB+ C3)/2
Multiplication	: (C1+A) x (C2+B) / C3
Division	: (C1+A) / (C2+B) x C3



Calculation Modules - 2

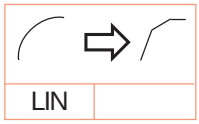
Square root	: C1 x √A + C2
Square	: C1 x A^2 + C2
Absolute	: C1 x |A| + C2
Negate	: C1 x (-A) + C2

MIDDLE MODULES (Continued ...)



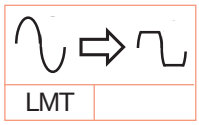
Select Module - 1

Selects & outputs Hi / Lo / 1 of 2 inputs as programmed by the user.



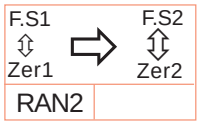
Lineariser - 1

Linearises the output from a non linear transducer using 11 point piece wise linearisation technique.



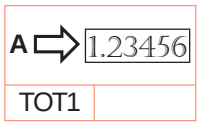
Limiting Module - 1

Limits the output to the Lo & Hi limits set by the user when the input exceeds the same.



Ranging Modules - 2

The input is scaled up or down to any user defined range within -999 and +9999.

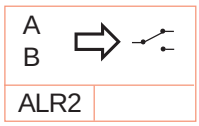


Totaliser Module - 1

Accepts soft wired input representing rate of flow and totalises it.

RIGHT END MODULES:

Soft-wired input and Hard wired output.

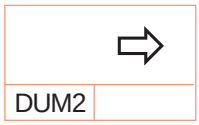


Alarm Modules - 3

Gives a potential free change over type contact output. User can set the alarm type to Hi, Lo or Deviation.

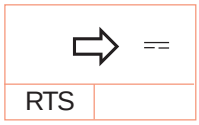
Dual Display Module - 1

Sends the output to Dual 6 digit LED display which can indicate -1999 to 999999. Resolution is user setable.



Dummy Modules - 2

Used to complete the programming path when there is a hanging middle or left end module.



Retransmission Module - 1

Outputs isolated 4-20mA / 0-20mA / 0-5V / 1-5V / 0-10V depending on the user selection.

ORDERING INFO

Model : Smart Tot Σ

No other ordering information is required as all the parameters are user configurable.

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