DynAmp

20mA SIGNAL TOTALIZER

Installation, Operation and Service Manual

Manual Item No. 045447

Rev. B

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DynAmp, LLC WARRANTY

Items and components manufactured by Seller for permanent installation are warranted for two (2) years from the date of shipment.

Items and components manufactured by Seller for portable and temporary use in more than one location are warranted to be free from defects in material and workmanship for a period of eighteen (18) months from the date of shipment.

Items and components not manufactured and resold by Seller are warranted by their manufacturer.

Warranty repair shall be, at DynAmp's option, in the form of repair or replacement of the defective items or components. Concerning warranty repairs, DynAmp will be responsible for DynAmp provided time, material and transportation costs (shipping or travel). Actual method of warranty repair / correction will be determined by DynAmp at DynAmp's sole option. Such warranty repair shall constitute a fulfillment of all DynAmp, LLC liabilities in respect to said items and components. In no event shall DynAmp, LLC be liable for consequential damages.

Information in this document is subject to change without notice.

This manual is part of the complete set of product documentation that includes installation, operation, and service instructions, drawings and test results. Users should evaluate the information in the context of the complete set of product documentation and their particular applications. DynAmp, LLC assumes no liability for any incidental, indirect, or consequential damages arising form the use of this documentation.

While all information presented is believed to be reliable and in accordance with accepted engineering practices, DynAmp, LLC makes no warranties as to the completeness of the information.

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Hazard Warning!

GENERAL

All installation, maintenance and service must be performed by qualified technicians who are familiar with the warnings and instructions of this manual.

Use of the equipment in a manner not specified by the manufacturer can impair the protection provided within.

DynAmp does not assume liability for the customer's failure to comply with the rules and requirements provided in this manual.

INSTALLATION

This equipment is intended for indoor use. The ambient temperature must not exceed 70 °C.

For mounting considerations that fall outside the recommended specifications provided in this manual, the factory should be contacted for approval.

This unit is rated for installation category III, 300V and pollution degree 2.

Symbol Identification:

General definitions of safety symbols used on equipment and manual.

Caution/Warning: Refer to accompanying documents for instructions.

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DynAmp, LLC Customer Support

For further assistance, contact DynAmp Customer Support at:

Americas:

Telephone: +1 614.871.6900 Fax: +1 614.871.6910

8:00 AM to 5:00 PM USA Eastern Time

From last Sunday in October to first Sunday in April – 13:00 GMT to 22:00 GMT

From first Sunday in April to last Sunday in October – 12:00 GMT to 21:00 GMT

Europe:

Telephone: +41 22.706.1446 Fax: +41 22.706.1311

8:30 AM to 5:00 PM Central European Time

From last Sunday in October to first Sunday in April – 7:30 GMT to 16:00 GMT

From first Sunday in April to last Sunday in October – 6:30 GMT to 15:00 GMT

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5:00 PM to 8:00 AM USA Eastern Time

From last Sunday in October to first Sunday in April – 22:00 GMT to 13:00 GMT

From first Sunday in April to last Sunday in October – 21:00 GMT to 12:00 GMT

Central e-mail:

help@dynamp.com

DynAmp web:

www.dynamp.com

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MANUAL REVISIONS

Page	Rev	Reason For Revision	Date
all	New		04/11
i,5,7,9	A	ECR 1674/5 Remove references to fixed item numbers / Harmonize name of product	11/11
I,5,7.15	B	ECO 3290 – Totalizers to uni-directional and include a bidirectional 1Ch shunt module	10/13

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TABLES

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1. SAFETY

1.1 OVERVIEW

The following are general guidelines that should be followed when installing, operating and servicing of the 20mA Signal Totalizer.

- Qualified technicians who are familiar with the warnings and instructions of this manual should perform all installation, maintenance and service procedures.
- Always follow all local and plant safety procedures.
- Do not place the equipment in the rain, or under water, or submerge any part of the system.
- The equipment is not intrinsically safe. Do not place in explosive atmospheres.
- Use of the equipment in a manner not specified by the manufacturer can impair the protection provided.

DynAmp does not assume liability for the customer's failure to comply with the rules and requirements provided in this manual.

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2. HANDLING AND STORAGE

DynAmp products are engineered and manufactured for use in industrial environments. However, they contain sensitive electronic and mechanical components which may be damaged and fail if not handled and stored properly. All products must be handled and stored with the same care as any precision measurement instrument. Severe bumps or jolts may damage internal parts and cause malfunction or premature failure. DynAmp products are designed and assembled with conformal coating, shock mounting, and environmental seals, when appropriate or when specified. However, this protection requires that the product must be properly installed and operational before the protection is fully functional. Therefore, adequate protection from humidity, shock, and temperature must be provided during handling and storage prior to installation.

The handling and storage of equipment must be sufficient to meet the storage temperature and humidity specifications of the product and to prevent any condensation or contact with water or any other liquid. The storage location and container or crate must provide adequate protection from precipitation (rain, snow, ice) and direct water contact. Adequate shelter must be provided to prevent the accumulation of precipitation (rain, snow, ice) and water which can lead to the deterioration or failure of shipping containers or crates and cause water ingress. Storage in coastal or industrial areas subject to salt-laden or corrosive air or areas of wind-driven sand or other abrasive dust must be adequate to prevent the deterioration or failure of shipping containers or crates and cause ingress. Frequent inspection of storage areas and storage containers or crates is required to ensure proper storage conditions are being maintained.

If the shipping container or crate is opened and/or the equipment is removed for inspection prior to installation, the equipment must be repackaged in the original undamaged container or crate in the same manner as it was shipped to prevent environmental damage or placed in a storage location that meets the required environmental and storage conditions.

General product storage temperature and humidity requirements:

Storage Temperature:	-40 to 70°C
	-40 to 158°F
Storage Humidity:	85%, non-condensing

DynAmp, LLC does not assume liability for the customer's failure to comply with handling and storage requirements.

For further assistance, contact DynAmp customer support.

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3. PRODUCT DESCRIPTION

3.1 OVERVIEW

This manual is intended primarily for personnel who install, operate or service the 20mA Signal Totalizer and/or Shunt Module in the field. In this manual “20mA Signal Totalizer” or “Totalizer” is used interchangeably with “Shunt Module”. Complete documentation consists of this manual and applicable drawings. Detailed descriptions of the Totalizer, detailed specifications, installation instructions, troubleshooting and service instructions and theory of operation are presented.

The Shunt Module is a single channel, bidirectional unit used to remotely terminate a 20mA loop.

The 20mA Signal Totalizer is a unidirectional unit used to sum 2 to 19 individual 20mA loops. It is available in three versions :

- 2 channel
- 3 to 10 channel
- 11 to 19 channel

The Shunt Module and all Signal Totalizers are passive devices.

3.2 APPLICATION

The DynAmp, LLC 20mA Signal Totalizer family is designed to sum together the signal(s) from 20mA loop outputs(s), or to remotely terminate a single 20mA loop.

A unique item number is assigned for each resistance value / channel number version.

Each totalizer is a passive device with mA current inputs and a voltage output. The individual 20mA input signals are connected in parallel through a high-precision, temperature stable resistor. The summed output signal is the voltage drop across the precision resistor.

Each totalizer is housed in a DIN rail mount enclosure. All terminal blocks are finger-safe (IP20 rated). The output is custom-scaled to a customer-specified voltage for a given input. The maximum output voltage is 1Volt full-scale. This minimizes the possibility of errors due to self-heating of the precision resistor.

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4. PRODUCT SPECIFICATIONS

Dimensions

Shunt Module	.89” x 3.3” x 4.20”
	22.5mm x 79.5mm x 106.7mm
2 Channel Totalizer	.89” x 3.3” x 4.20”
	22.5mm x 79.5mm x 106.7mm
3 to10 Channel Totalizer	.1.57” x 3.3” x 4.20”
	39.9mm x 79.5mm x 106.7mm
11 to 19 Channel Totalizer	3.14” x 3.3” x 4.20”
	79.8mm x 79.5mm x 106.7mm

Weight

Shunt Module	0.3lb (154g)
2 Channel	0.3lb (154g)
3 to 10 Channel	0.5lb (257g)
11 to 19 Channel	1lb (513g)

Temperature

Temperature Coefficient	10 ppm / °C (max)
Working Temperature	- 10 °C to + 70 °C

Electrical

Signal Input	20mA per Channel
Signal Output 1 & 2	0 to 1V (or customer specified full-scale value)
Accuracy	< 0.1%
Power Consumption (DC)	< 1 W (typical)

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5. INSTALLATION

5.1 HANDLING PRECAUTIONS

The 20mA Totalizer and/or Shunt Totalizer is intended for use in industrial measurement systems. The totalizer is mounted on a DIN rail. The DIN should be inside an industrial enclosure or control room environment. The totalizer should be handled with the same care as any precision measurement instrument. Personnel involved in the installation should be experienced with equipment of similar form and function, and should also be familiar with the technical terms, warnings, and instructions in this manual, and all plant safety rules, and be able to follow these.

The totalizer should be inspected for shipping damage at the earliest opportunity. Visible damage must be reported to the carrier immediately. Concealed damage (not evident until the system is operated) must be reported to DynAmp, LLC immediately.

5.2 UNPACKING THE EQUIPMENT

Before unpacking any equipment, inspect the exterior packaging for visible damage incurred in transit. Remove the outer wrapping or packaging. Check all items against the packaging slip. If damage is suspected during shipping and handling, contact DynAmp, LLC Customer Support.

5.3 GENERAL INSTALLATION CONSIDERATIONS

There are two sets of terminals designated for connecting to the totalizer output voltage.

The two output signals are connected directly in parallel. The outputs are not galvanically isolated from each another. When both outputs are connected, the user must be sure that the inputs of the equipment being connected to are isolated or floating.

Each totalizer is housed in a DIN rail mount enclosure. All terminal blocks are finger-safe (IP20 rated). The output is custom-scaled to a customer-specified voltage for a given input. The recommended maximum output voltage is 1Volt full-scale. This minimizes the possibility of errors due to self-heating of the precision resistor.

For applications where a higher output voltage is required, a signal isolator/transmitter should be used. To generate the higher output voltage, the totalizer output is connected as the input signal to the transmitter. This output may be scaled for Volts or mA. For more information contact DynAmp regarding:

Item No. 044079 “Isolator, fully Adjust. CE 20-253V AC/DC Supply
INPUT: 20mV-200V / 0.1mA – 100mA uni/bipolar
OUTPUT: 0-10V / 0-20mA / 4-20mA
1000V Working Voltage (Basic Insulation)
600V In-to-Out & 300V Out-supply Reinforced Insulation

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6. TROUBLESHOOTING AND SERVICE

6.1 ROUTINE MAINTENANCE

As is true with any electronic circuitry, proper maintenance will prolong the service life. DynAmp, LLC recommends the following program be performed at the recommended interval to prevent or detect damage to the System and to ensure continuing reliable performance. Always use appropriate measures to correct any problems found. Following the suggested maintenance may assist in early diagnosis of problem(s) to minimize repairs and down time.

6.2 CLEANING INSTRUCTIONS

Dust and dirt may be removed from the totalizer by gently vacuum cleaning the unit.

6.3 VERIFICATION

Periodic verification of the key instruments used in modern plants is a requirement of quality assurance programs such as ISO 9000.

PERMANENTLY INSTALLED SYSTEM

-Typically 48 months or as required by plant specific programs. The totalizer should be checked if there is an excessive difference between the measurement of the primary measurement system and a secondary (back up) system. Verification should also be performed if any change in the difference between the primary measurement system and secondary system is noted.

-Any time the accuracy or proper operation of a unit or units is in question.

6.4 SERVICE ASSISTANCE

For further assistance, contact DynAmp Customer Support at:

Americas:

Telephone: +1 614.871.6900 Fax: +1 614.871.6910

8:00 AM to 5:00 PM USA Eastern Time

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Central e-mail:

help@dynamp.com

DynAmp web:

www.dynamp.com

7. THEORY OF OPERATION

The principle of operation is a direct implementation of Ohm's Law :

The voltage drop across the sensing resistor is proportional to the current flowing through it.

In addition, low ohmic value series resistors are added between each current loop positive terminal and the summing junction of the sensing resistor. These resistors prevent interaction between the individual current loop circuits. The series resistors do not affect the measurement.

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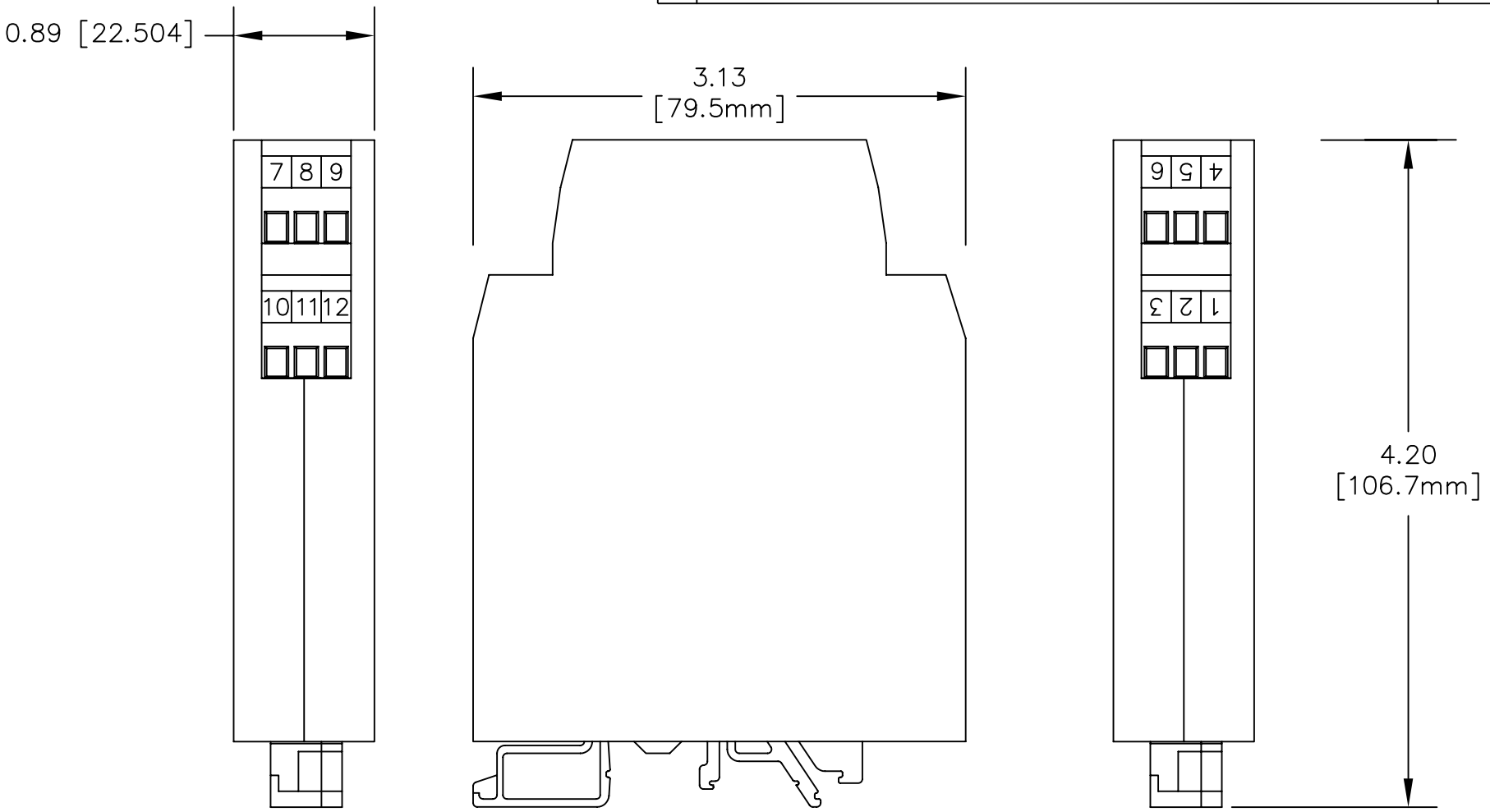
8. DRAWINGS

TABLE 8.1
DRAWING LIST

DRAWING TITLE	NUMBER
Outline and Mounting, 2 Channel	02A108925
Outline and Mounting, 10 Channel	02A108969
Outline and Mounting, 19 Channel	02A109178
Wiring Diagram - 2 Channel Totalizer	83A109177
Wiring Diagram - 10 Channel Totalizer	83A109021
Wiring Diagram - 19 Channel Totalizer	83A109179

SYM.	REVISION	DRN./DATE	CK'S/DATE
A	E-3209: CHG HOUSING TYPE. WAS: UEG20 IS: UEGH22,5	RJM 3-23-09	



NOTE:

1.) ENCLOSURE MAY BE MOUNTED ON 35mm x 7.5mm OR "G" PROFILE 32mm X 15mm DIN RAIL.

B/M NO.(REF.)	THIRD ANGLE PROJECTION	DO NOT SCALE PRINT
044752		TOL. UNLESS OTHERWISE NOTED
		DEC. ±.015 / FRAC. ±.015 / ANG. ±1°

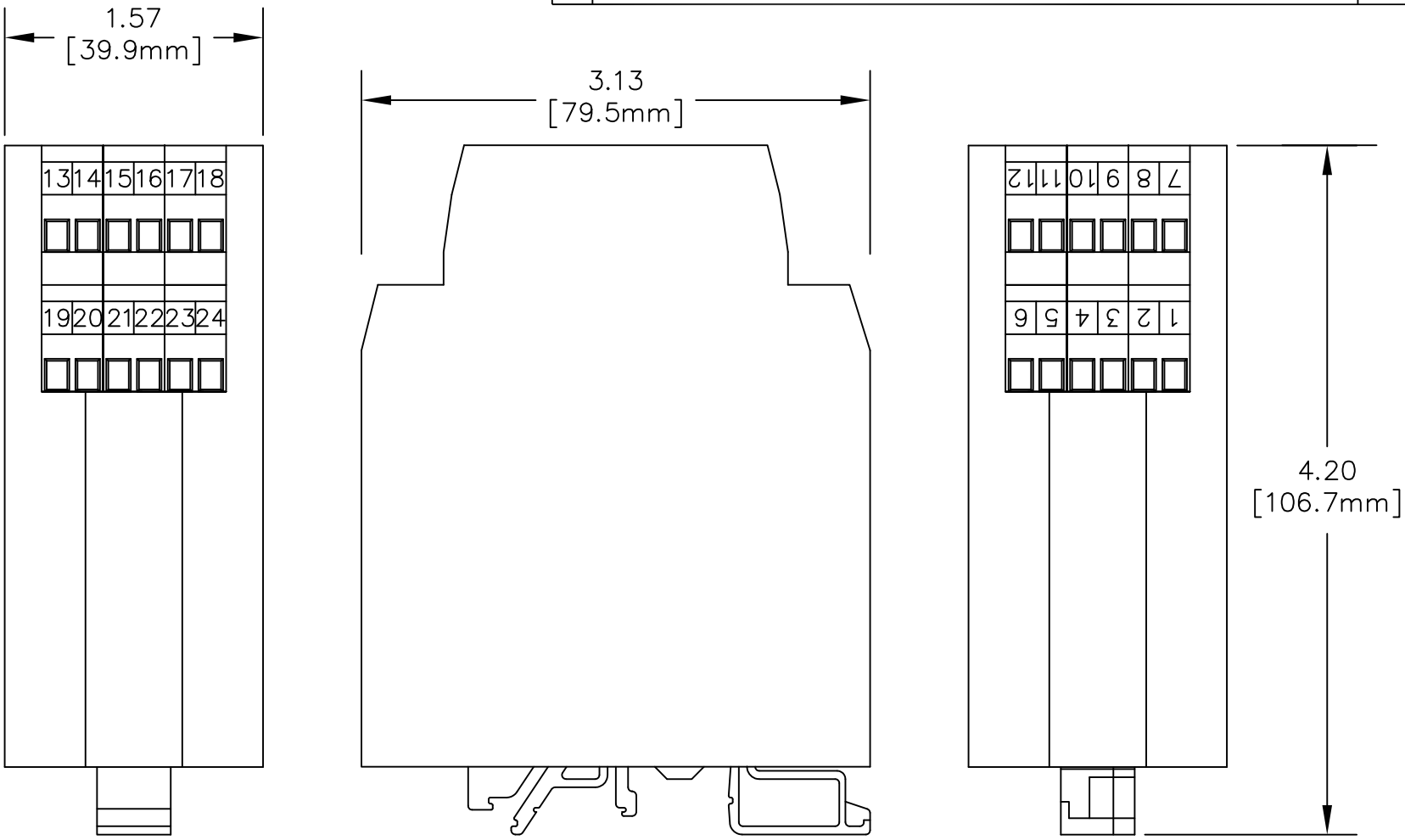
FINISH	DRN./DATE	SCALE
	RJM 11/21/06	FULL
MAT'L	CK'D/DATE	APV./DATE
	DEO 03/23/06	FEM 03/24/06

DynAmp, LLC GROVE CITY, OHIO

TITLE: OUTLINE – 20mA SIGNAL TOTALIZER MODULE (2 CHANNEL)

JOB | DWG. NO. 02A108925 | REV. A

SYM.	REVISION	DRN./DATE	CK'S/DATE
A	E-3231: MIRROR POSITION OF DIN MOUNTING FOOT	RJM 2-23-10	

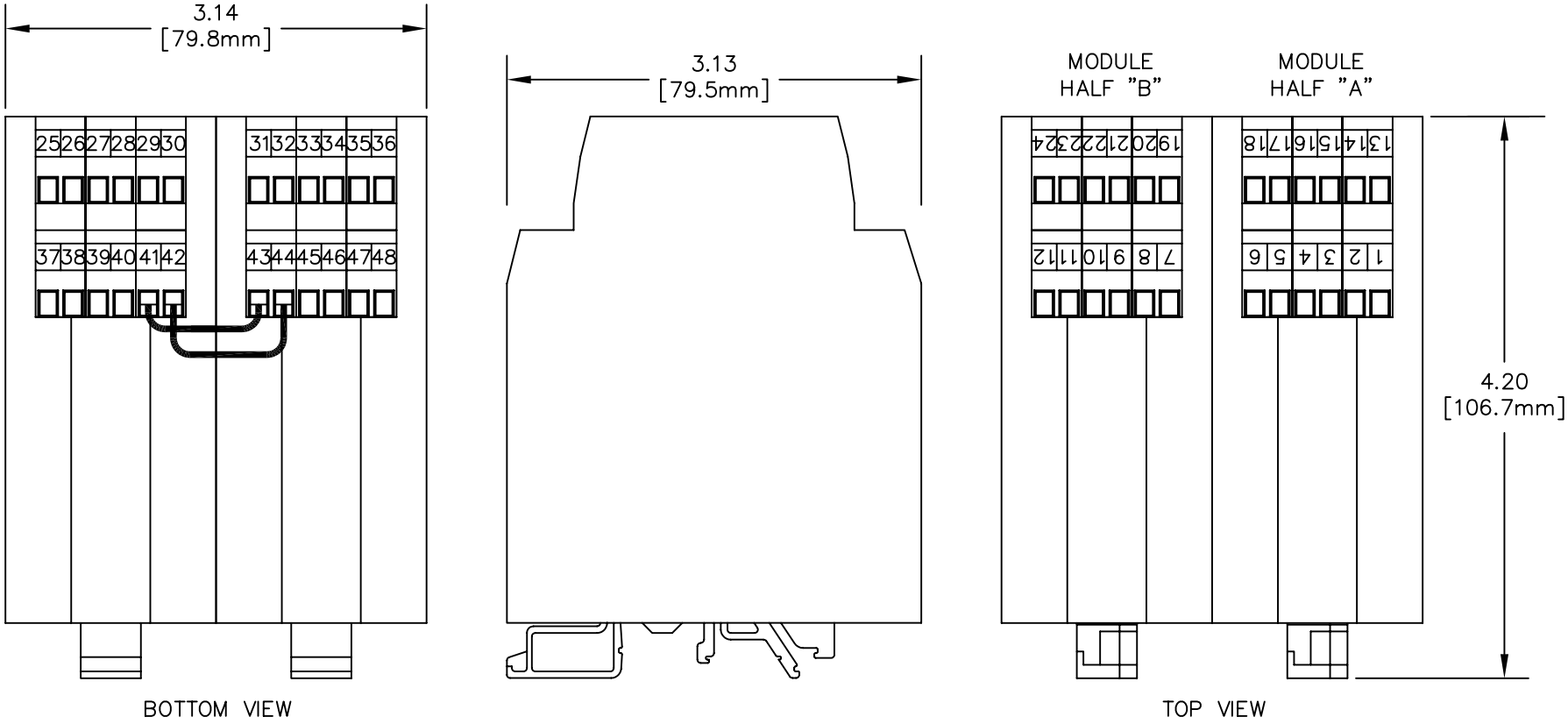


NOTE:

1.) ENCLOSURE MAY BE MOUNTED ON 35mm x 7.5mm OR "G" PROFILE 32mm X 15mm DIN RAIL.

B/M NO.(REF.) 044864	THIRD ANGLE PROJECTION	DO NOT SCALE PRINT	DynAmp, LLC GROVE CITY, OHIO
		TOL. UNLESS OTHERWISE NOTED: DEC. ±.015, FRAC. ±.015, ANG. ±1°	
FINISH		DRN./DATE RJM 11/21/06; SCALE FULL	TITLE: OUTLINE – 20mA SIGNAL TOTALIZER MODULE (10 CHANNEL)
MAT'L		CK'D/DATE FEM 12/22/06; APV./DATE DEO 1/02/07	JOB; DWG. NO. 02A108969; REV. A

SYM.	REVISION	DRN./DATE	CK'S/DATE



NOTE:

1.) ENCLOSURE MAY BE MOUNTED ON 35mm x 7.5mm OR "G" PROFILE 32mm X 15mm DIN RAIL.
2.) MODULE HALF "A" IS BONDED TO MODULE HALF "B" WITH RTV ADHESIVE.

B/M NO.(REF.) 045427	THIRD ANGLE PROJECTION	DO NOT SCALE PRINT	DynAmp, LLC GROVE CITY, OHIO
		TOL. UNLESS OTHERWISE NOTED: DEC. ±.015, FRAC. ±.015, ANG. ±1°	
FINISH		DRN./DATE: RJM 4/16/10	SCALE: FULL
MAT'L		CK'D/DATE	APV./DATE

TITLE: OUTLINE – 20mA SIGNAL TOTALIZER
11 – 20 CHANNEL MODULE

JOB | DWG. NO. 02A109178 | REV. –

SYM.	REVISION	DRN./DATE	CK'S/DATE

NOTE:

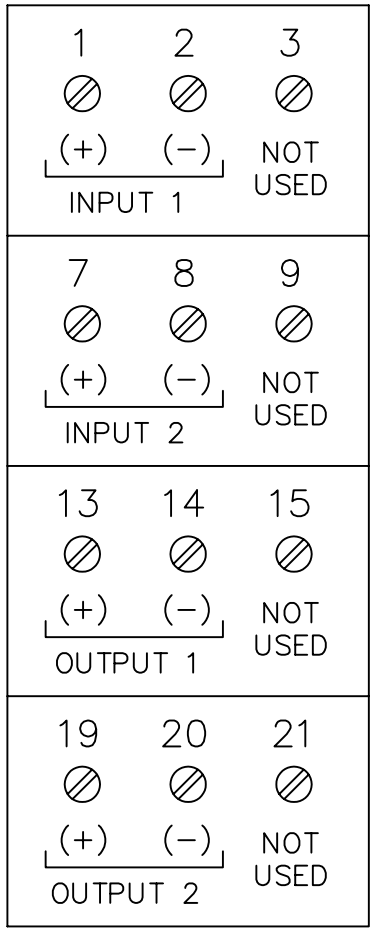
1.) UP TO (2) 20mA SIGNALS MAY BE SUMMED USING THIS TOTALIZING MODULE.

2.) TERMINALS WILL ACCEPT WIRE SIZES 24AWG TO 12 AWG (SINGLE WIRE, STRANDED).

3.) ONE OR TWO WIRES MAY BE CONNECTED TO EACH OUTPUT TERMINAL USING WIRE SIZE 18AWG TO 24AWG STRANDED WIRE.

4.) STRIP LENGTH: 0.31" (8mm)

5.) SCREW TORQUE: 5.3 inch–pound (0.6 N.m.)



TOTALIZING MODULE
WIRING CONNECTIONS

B/M NO.(REF.) 045752	THIRD ANGLE PROJECTION	DO NOT SCALE PRINT	DynAmp, LLC GROVE CITY, OHIO
		TOL. UNLESS OTHERWISE NOTED: DEC. ±.015 / FRAC. ±.015 / ANG. ±1°	
FINISH		DRN./DATE: RJM 4/23/10	SCALE: N/A
MAT'L		CK'D/DATE	APV./DATE

TITLE: WIRING DIAGRAM – 1 OR 2 CHANNEL 20mA TOTALIZING MODULE

JOB | DWG. NO. 83A109177 | REV. –

SYM.	REVISION	DRN./DATE	CK'S/DATE

NOTE:

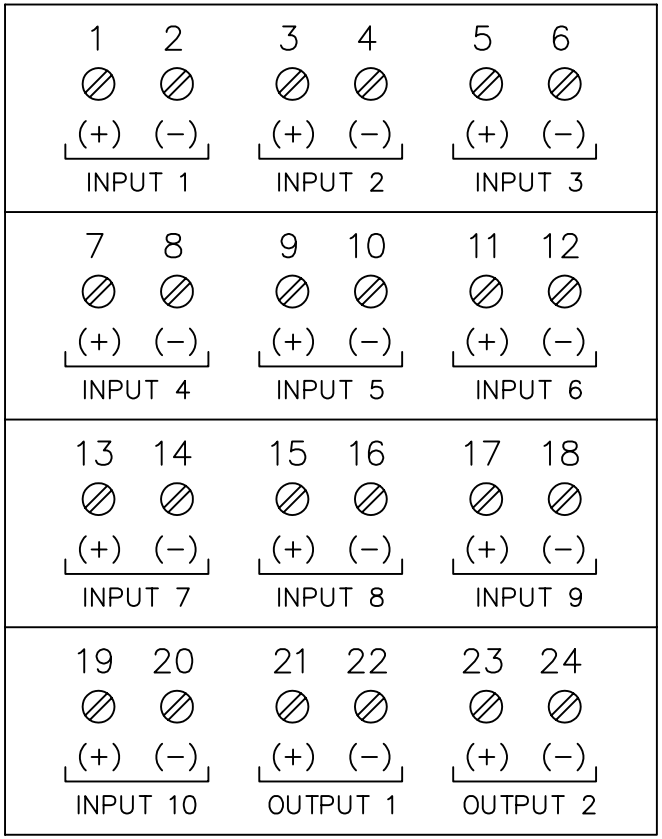
1.) UP TO (10) 20mA SIGNALS MAY BE SUMMED USING THIS TOTALIZING MODULE.

2.) TERMINALS WILL ACCEPT WIRE SIZES 24AWG TO 12 AWG (SINGLE WIRE, STRANDED).

3.) ONE OR TWO WIRES MAY BE CONNECTED TO EACH TERMINAL USING WIRE SIZE 18AWG TO 24AWG STRANDED WIRE.

4.) STRIP LENGTH: 0.31" (8mm)

5.) SCREW TORQUE: 5.3 lb.in. (0.6 N.m.)



TOTALIZING MODULE
WIRING CONNECTIONS

B/M NO.(REF.) 044864	THIRD ANGLE PROJECTION	DO NOT SCALE PRINT	DynAmp, LLC GROVE CITY, OHIO
		TOL. UNLESS OTHERWISE NOTED: DEC. ±.015, FRAC. ±.015, ANG. ±1°	
FINISH		DRN./DATE: RJM 9/21/07	SCALE: N/A
MAT'L		CK'D/DATE	APV./DATE

TITLE: WIRING DIAGRAM – 10 CHANNEL 20mA TOTALIZING MODULE

JOB | DWG. NO. 83A109021 | REV. –

SYM.	REVISION	DRN./DATE	CK'S/DATE

NOTE:

1.) UP TO (20) 20mA SIGNALS MAY BE SUMMED USING THIS TOTALIZING MODULE.
2.) TERMINALS WILL ACCEPT WIRE SIZES 24AWG TO 12 AWG (SINGLE WIRE, STRANDED).
3.) ONE OR TWO WIRES MAY BE CONNECTED TO EACH TERMINAL USING WIRE SIZE 18AWG TO 24AWG STRANDED WIRE.
4.) STRIP LENGTH: 0.31" (8mm)
5.) SCREW TORQUE: 5.3 inch–pound (0.6 N.m.)

MODULE HALF "A"			MODULE HALF "B"		
1 2 (+) (–) INPUT 1	3 4 (+) (–) INPUT 2	5 6 (+) (–) INPUT 3	7 8 (+) (–) INPUT 4	9 10 (+) (–) INPUT 5	11 12 (+) (–) INPUT 6
13 14 (+) (–) INPUT 7	15 16 (+) (–) INPUT 8	17 18 (+) (–) INPUT 9	19 20 (+) (–) INPUT 10	21 22 (+) (–) INPUT 11	23 24 (+) (–) INPUT 12
25 26 (+) (–) INPUT 13	27 28 (+) (–) INPUT 14	29 30 (+) (–) INPUT 15	31 32 (+) (–) INPUT 16	33 34 (+) (–) INPUT 17	35 36 (+) (–) INPUT 18
37 38 (+) (–) INPUT 19	39 40 (+) (–) INPUT 20	41 42 (+) (–) JUMPER OUT	43 44 (+) (–) JUMPER IN	45 46 (+) (–) OUTPUT 1	47 48 (+) (–) OUTPUT 2

TOTALIZING MODULE
WIRING CONNECTIONS

B/M NO.(REF.) 045427

THIRD ANGLE PROJECTION

DO NOT SCALE PRINT
TOL. UNLESS OTHERWISE NOTED
DEC. ±.015 | FRAC. ±.015 | ANG. ±1°

FINISH

MAT'L

DRN./DATE RJM 4/19/10

CK'D/DATE

SCALE N/A

APV./DATE

DynAmp, LLC GROVE CITY, OHIO

TITLE
WIRING DIAGRAM – 20 CHANNEL
20mA TOTALIZING MODULE

JOB

DWG. NO. 83A109179

REV. –