DART*PAK*™

Portable Analysis Kit
Operating Instructions

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DART*PAK*™ Description

The DART*PAK*™ Portable Analysis Kit is designed for portable applications where flexibility is required for collecting data from machines stationed at varying locations. The DART*PAK*™ unit is configured with multiple channels of signal conditioning and is capable of reading a wide range of sensors. Inputs to the DART*PAK*™ unit may include: strain gage inputs from plastic or hydraulic pressure sensors, potentiometer inputs for monitoring screw travel displacement, and high level voltage signals for the measurement of mold deflection, ram velocity, and melt, barrel, water or mold temperature. (External signal conditioning is required for thermocouples.) DART*PAK*™ selectable digital display is standard for monitoring incoming signals. For maximum convenience, only one trigger source from the machine needs to be interfaced to allow the system to collect data from each cycle, although there are four available trigger inputs. Cables and sensors can be stored in the bottom portion of the enclosure for easy transport. The case size is compatible with airline standards allowing it to be checked in as carry-on luggage.

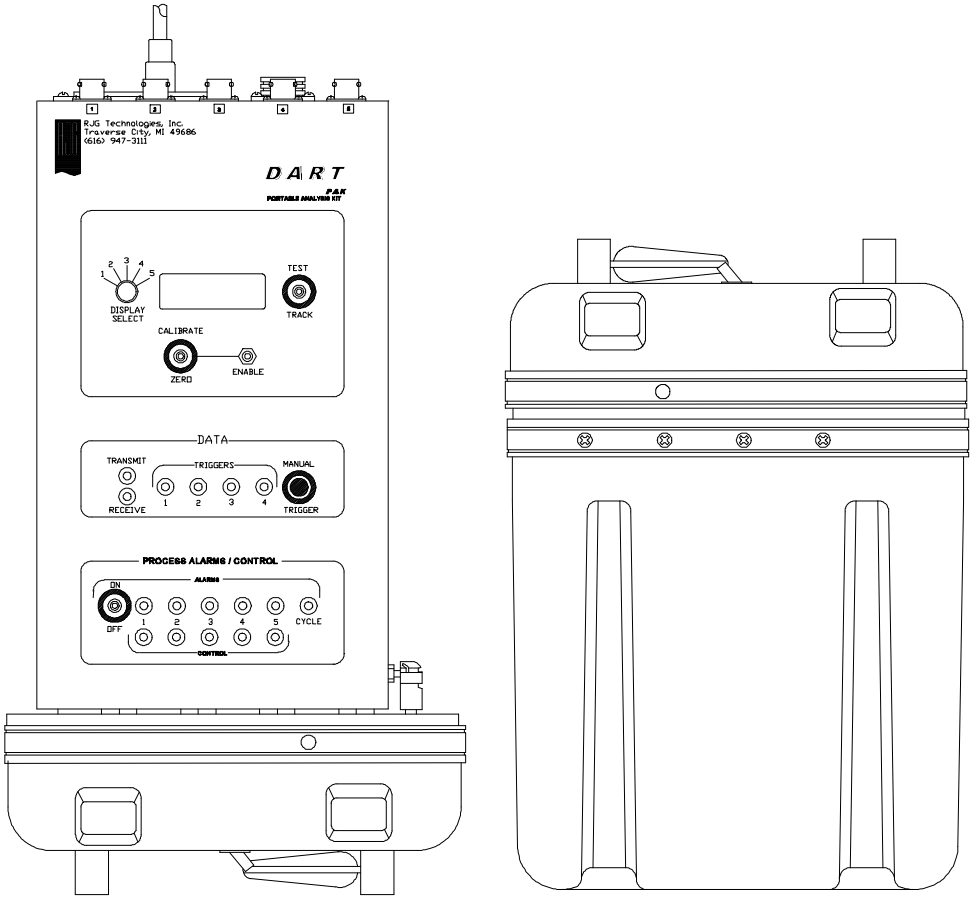


Figure 1

DART*PAK*™ Portable Analysis Kit

DART*PAK*™ Components

The following describes the physical layout and function of the DART*PAK*™'s components.

Front Panel Description

The following describes the features accessible from the front panel of DART*PAK*™, shown in Figure 2:

Display Select Control

Each of the input signals to the DART*PAK*™ can be displayed depending on the position of the Display Select switch.

Test/Track Switch

In the Test mode, the display shows the amplified analog signal (in units of volts or mV) being sent to the DART. This feature is available for diagnostics and troubleshooting. In the Track mode, the display shows the sensor reading from the selected channel as it is scaled in engineering units through the accompanying DART*Net* (Version 2.7 and above) or DART*Win*™ software.

Calibrate/Zero Switch and Enable Push Button

The Calibrate/Zero switch and Enable push button allows the user to manually zero and provide a shunt calibration for each channel. This procedure is necessary to acquire accurate data used in conjunction with DART*Net* or DART*Win*™ software. These controls combined with the Test/Track switch provide

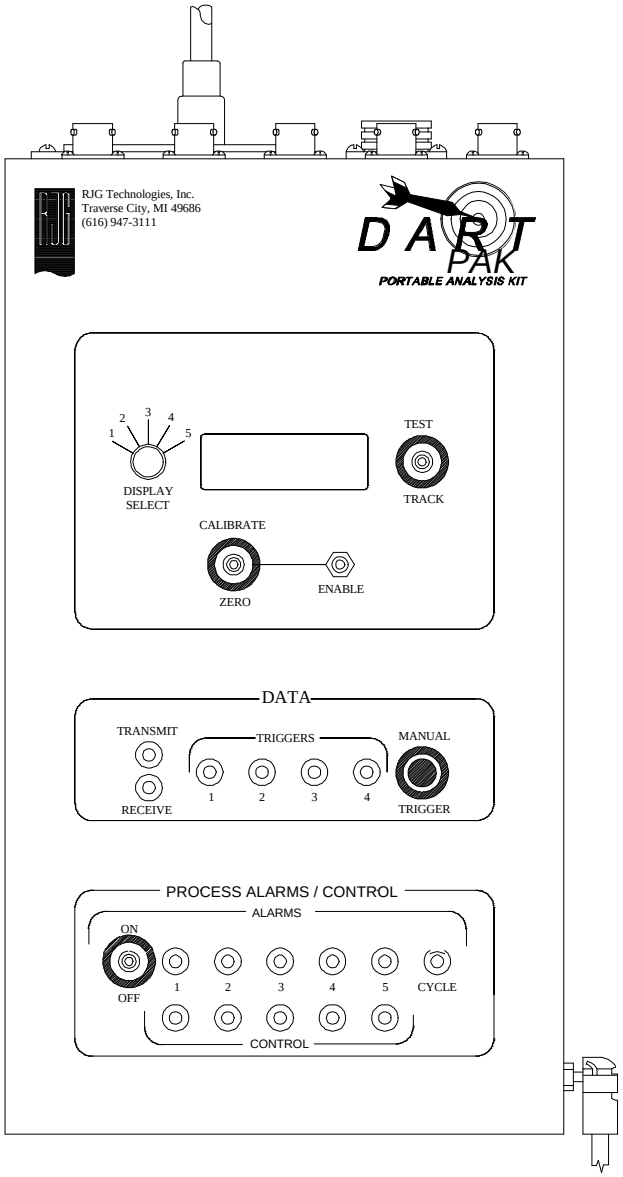


Figure 2

DART*PAK*™ Front Panel

the user with four combinations which perform the following:

Track Mode

1. Zero-Enable
   This combination allows the user to zero the display and input from the selected channel. To perform the zero function, put the Test/Track switch in the Track mode, hold the Calibration/Zero switch in the Zero position, and push the Enable button.

2. Calibrate-Enable

   This combination applies a 200K shunt calibration to the selected channel input and calibrates the display to read the scale factor in engineering units or gain factor, which is set from the DART*Net* (Version 2.7 and above) or DART*Win*™ software. This combination applies to DART*Win*™ software only after it is running on your computer and the computer is connected to the DART*PAK*™ box. To perform the calibration, put the Test/Track switch in the Track mode, hold the Calibration/Zero switch in the Calibrate position, and push the Enable push button.

Test Mode

1. Zero-Enable

   With an unloaded transducer in the Test mode, this shows the actual zero offset of the attached transducer in millivolts. When performing a Zero-Enable, if switched back into the Track position, the amount of offset in engineering units will be displayed.

2. Calibrate-Enable

   When in the Test mode, performing a Calibrate-Enable shows the calibration voltage level in millivolts, including the offset.

Data LED Indicators and Manual Trigger

1. Transmit LED

   When flashing, this LED indicates that the DART*PAK*™ is sending information to the computer which is displaying and storing data. A flicking light indicates summary data or waiting for next cycle. A steady light indicates cycle data is transmitting.

2. Receive LED

   This amber LED, when flashing indicates that the connected computer is asking for messages from the DART*PAK*™ electronics.

3. Trigger LEDs

The yellow trigger LED's indicate when each trigger is "ON." Trigger inputs may be 5-24 Volts DC or 120 Volts AC. See *DARTPAK™ Components - End Panel Description - Trigger Voltage Input Connector* section for Trigger assignments.

4. Manual Trigger Button

This push button allows a manual trigger to be input for testing the DART sequencing and transmit and receive functions without cycling the machine. Pushing the button starts the trigger [Trigger 1], holding it keeps it on, and releasing it stops the trigger.

Process Alarms/Controls

Alarms

1. ON/OFF Switch

The ON/OFF switch enables or disables the Master Alarm output only.

2. 2. Alarm LED's

Each input channel has a process alarm LED associated with it. The alarm LED's turn "ON" or "OFF"depending on the alarm level settings (operator set in the DART*Net* or DART*Win*™ software), which has exceeded the minimum or maximum alarm level settings for the corresponding DART*PAK*™ channels. An additional LED indicates when the cycle time is out of the limits set in the DART*Net* or DART*Win*™ software. On any channel an Alarm will actuate the Master Alarm Output if the switch is "ON."

Control

A green LED for each Control channel is found on the DART*Scanner*™'s front panel. This LED reflects the state of the Control Relay contacts. The Control Relays close and open depending on a set-point configured in the DART*Net* or DART*Win*™ software. When the relay is energized, the contacts closes, and the green Control LED lights up. The contacts open up when the relay is de-energized and the light turns off. The Control LEDs are useful in determining when and if the transfer is happening.

Side Panel Description

The following describes the electrical connections made at the side of the DART*PAK*™, as shown in Figure 3:

GFCI Duplex Outlet

The GFCI (Ground Fault Circuit Interrupter) Duplex outlet is provided for powering a laptop computer for DART data collection. The GFCI Duplex outlet is "ON" when the Reset button is pushed in and remains in. The output voltage is the same voltage level as the input power switch module used to power the box. The outlet is not available for 220 VAC applications.

Pin	Signal (RS-485)	Color
2	Receive Data	Green
3	Transmit Data	Red
7	Request to Send	White
5	Ground - Shield	Black

Table 1 - COM 1 Pinouts

COM 1

This is the communication connector where the computer serial cable plugs in. A standard D9-D9 serial cable provides connection to a standard RS-232 serial port.

DARTNET (External DARTs Connector)

With this connector, additional DARTs can be plugged into the data collection system. Three external DART/3015 channels can be used with the standard power supply in the DART*PAK*™. External signals supplied include: power, all 4 triggers and the RS-485 communications protocol to the external DARTs.

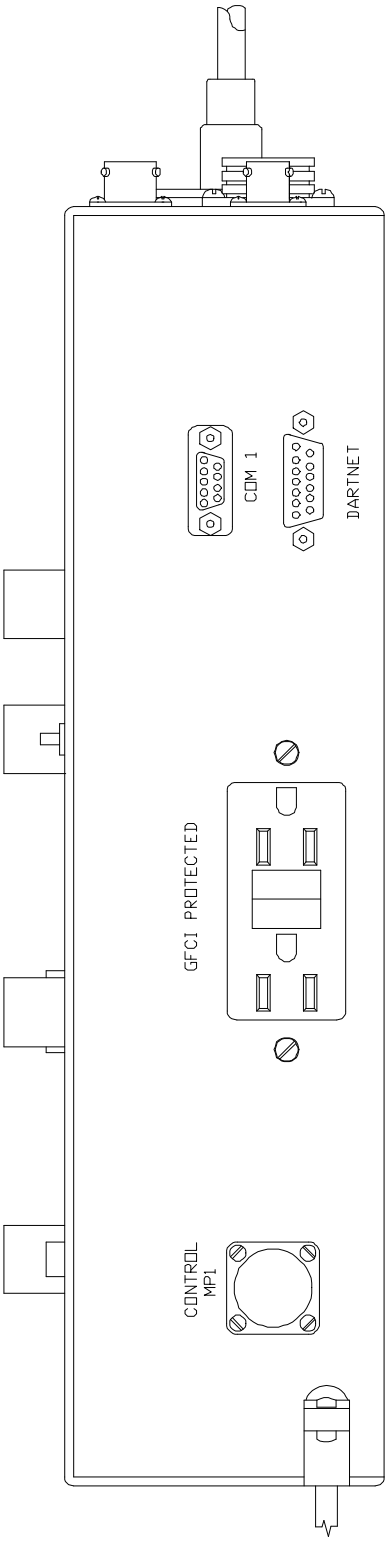


Figure 3

DART*PAK* ™ Side Panel

Pin	Signal (RS-485)	Direction	Color
1	System Ground	--	Brown
2	Power	OUT	Orange
3	Trigger	OUT	Green
4	Transmit/Receive +	BIDIR	Violet
5	Transmit/Receive -	BIDIR	White
6	Not Used	--	Brown
7	Not Used	--	Orange
8	Cycle Time Alarm		Green
9	Cycle Time Alarm		Red
10	Out		Yellow
11	Trigger 2		Blue
12	Trigger 3		Gray
13	Trigger 4		Black
14	Trigger in Common		Red
15	Alarm Out (DART)		Yellow
	Alarm Out Common		

Table 2 - DARTNET Pinouts

MP1 Control (Optional)

The purpose of this 6 Pin male Bendix panel mount connector is to control the molding machine. A T-DSCP cable is used to connector the machine to the DART*PAK*™ box. The cable has three pre-wired control output options available for you to use. The options are: 0 - 10 Volts, 0 - 20 mV, and Contact Closure. For more information on these options, examine the *Installation* section of this manual.

End Panel Description

The following describes the trigger, signal, and power inputs found on the end panel of DART*PAK*™, as shown in Figure 4:

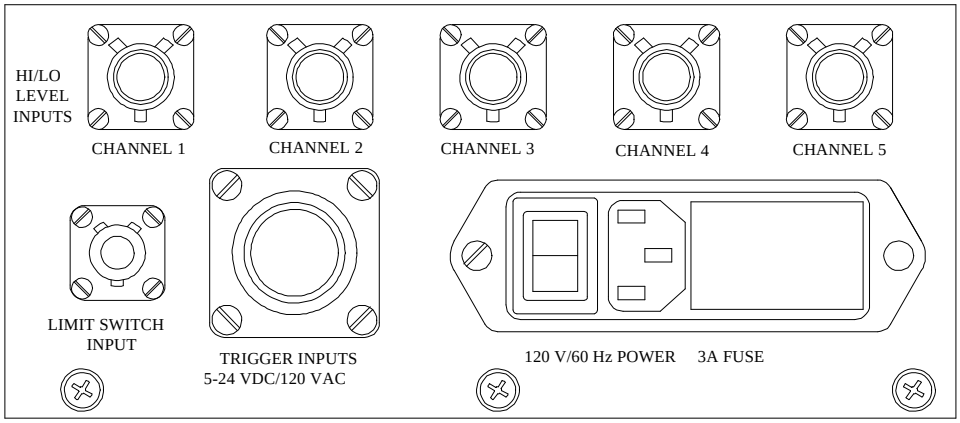


Figure 4

DART*PAK*™ Top Panel

DO **NOT** INPUT A VOLTAGE ON THE CONDUCTORS OF THE DRY CONTACTS. THIS WILL CAUSE DAMAGE TO THE INTERNAL TRIGGER TIMER!

HI/LO Level Inputs

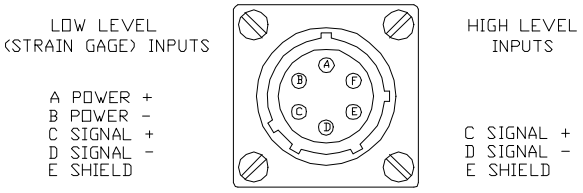


Figure 5

Input Connectors for High & Low Level Inputs

The bank of five Bendix connectors (Channels 1 to 5) are used to input high or low level analog signals to the DART*PAK*™ electronics. Typically, low level strain gage based signals from mold pressure sensors or hydraulic pressure sensors are input at these connectors. If properly configured, high level voltage signals may be input to any or all channels by switching the channel gain and re-calibrating the channel. Figure 5 shows the wiring to the input connectors for the high and low level inputs. Access to the Gain switch is found inside the rear panel through the Rear Access door. *(See DARTPAK™ Components - Rear Access Panel Description section.)*

NOTE: Contact RJG Technologies for technical assistance before attempting to reconfigure any channels in the field.

Limit Switch Input

This is a Bendix style input connector for utilizing the DART*PAK*™ with one dry contact closure input to trigger the DART instead of using voltage inputs as triggers. A contact closure between Conductors "A" and "C" available on the connector starts Trigger 1. The duration of this trigger is determined by the Trigger Time Limit

setting in the DART*Net* (Version 2.7 and above) or DART*Win*™ software. Generally, a Limit switch temporarily placed on the tie-bar of the machine for detecting when the mold closes for the start of Trigger 1 is used to acquire a contact closure trigger.

DO NOT INPUT A VOLTAGE ON THE CONDUCTORS OF THE DRY CONTACTS. THIS WILL CAUSE DAMAGE TO THE INTERNAL TRIGGER TIMER!

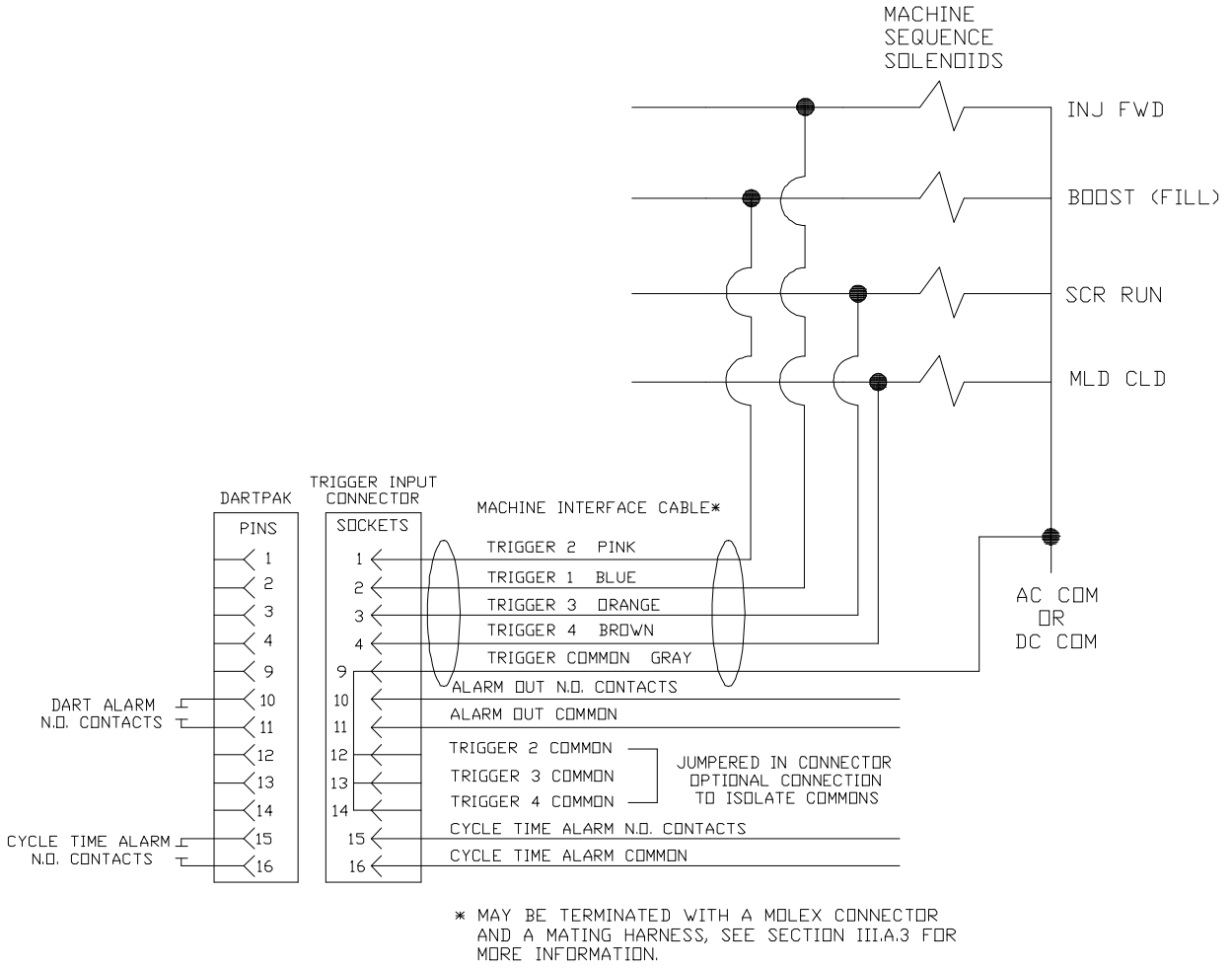


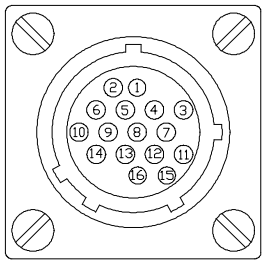
Figure 6

Trigger Voltage Connection to Machine Sequence solenoids

Trigger Voltage/Power Input/Alarm Output Connector

This black plastic 16 Pin CPC connector is used to input the four data collection triggers to the DART*PAK*™ by using the machine interface cable and mating harness supplied by RJG. The four triggers universally accept 5-24 VDC or 115 VAC trigger input from the machine. The trigger commons are used as a common current carrying return line for completing the trigger circuit. In addition, the

Master Alarm Output (N.O. relay contacts) and the Cycle Time Alarm Output (N.O. relay contacts) are also available for connection to any alarm lights, buzzers, conveyor systems, etc. Both sets of N.O. contacts are rated 1/3 HP, 15 amps @ 120 VAC; ½ HP, 10 amps @ 250 VAC or 10 amps @ 30 VDC. [The wires are accessed under the heat shrink on the 5 Pin Molex connector end.]



1. FILL, TRIGGER 2
2. INJ FWD, TRIGGER 1
3. SCREW RUN, TRIGGER 3
4. MOLD CLOSE, TRIGGER 4
9. TRIGGER COMMONS
10. MASTER ALARM OUT N.O.
11. ALARM OUT COMMON
12. TRIG COM 2
13. TRIG COM 3
14. TRIG COM 4
15. CYCLE TIME ALARM N.O.
16. CYCLE TIME ALARM COMMON

Figure 7

Connector Pinout

The connector pinout is shown in Figure 7. The voltage inputs are tapped off of the machine's sequence solenoids as shown in Figure 6. The conventional trigger inputs available from most molding machines consist of: (1) Injection Forward (or Injection Total) signal, (2) Fill (or Boost) signal, (3) Screw Run (4) Mold Closed (or Mold Open) signal.

They are assigned as Triggers 1, 2, 3, and 4 respectively. Only Trigger 1 is necessary for allowing the DART*PAK*™ to collect data. Triggers 2, 3, and 4 are solely for additional data collection capability. Also, note each trigger has its own Trigger Common. This allows the user to input a variety of AC & DC triggers while maintaining electrical isolation between the triggers. The Master Alarm Output (N.O. relay contacts) and Cycle Time Alarm Output (N.O. relay contacts) are turned "ON" (Contact Close); whenever, the corresponding alarm setting is met or exceeded. The values are set in the DART*Net* and the DART*Win*™ software. The Master Alarm Output can be turned "OFF" by switching "OFF" the Process Alarm's switch on the front panel *(See DARTPAK™ Components - Front Panel Description - Calibrate/Zero Switch And Enable Push Button - Process Alarms section.)*

Power Switch Module

The power switch module is a 3A fused ON/OFF switch which powers the box. [120V/60 Hz POWER 3A FUSE]

Rear Access Panel Description

The following describes the use for the Gain Set switches under the Access panel on the back of the DART*PAK*™. See Figure 8 for the Rear Access panel and switch locations.

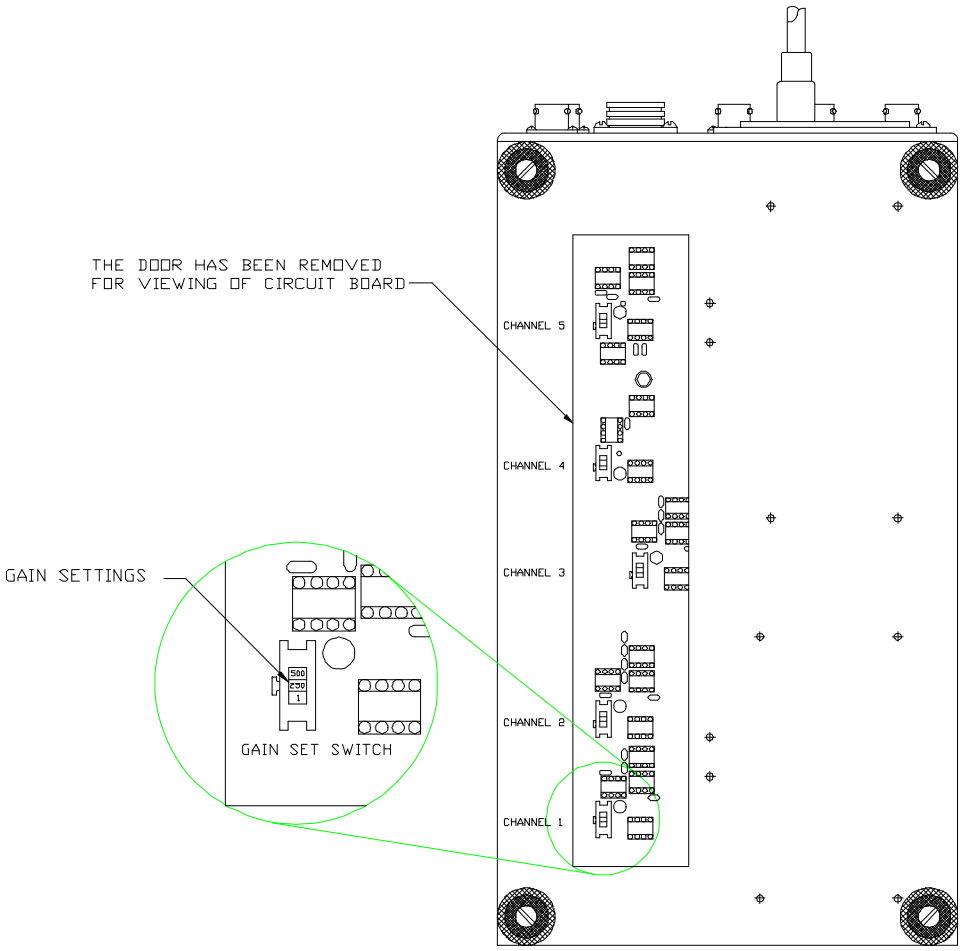


Figure 8

DART*PAK*™ Rear Panel

NOTE: No metal tools should be used when working inside of this box. Always power down this unit before opening the rear access door

Gain Set Switches

Each channel on the DART*PAK*™ can be configured with a gain of 1, 250, or 500 depending on the specific application. The position settings for Gains of 500, 250, and 1 are shown in Figure 8, as the top, middle and bottom position for all channels.

Typically, a hydraulic strain gage input will be set with a gain of 250 (See Table 3). A mold pressure strain gage input is set with a gain of 500. Finally, a gain of 1 is used for a high level signal input up to a 10V maximum input. After setting the correct gain, you must specify the transducer type, pin size or full scale output in the DART*Net* (Version 2.7 and above) or DART*Win*™ software, so that the internal DART channels can properly scale the display and the stored data.

Table 3 shows the corresponding input signal level designations for the respective gain settings.

0 - 10 V HYD MP1	1 250 500	Low Gain Mid Gain High Gain	0 - 10 V - 20 mV to + 20 mV - 10 mV to + 10 mV

Table 3 - Inputs: Differential

DC Common Mode rejection to +/- 10 V maximum.

NOTE: The standard Gain switch position for a DART*PAK*™ channel with an MPT input is High Gain [500]. This is because it provides the best resolution for most applications. However, if you pressure climbs above the transducer's half scale, the measurement will "peg out" or plateau at the half scale level. In the software this will manifest itself in a curve that seems to have its top cut off. If this happens, changing that channel's Gain switch to Mid Gain [250] and re-calibrating that channel will give you the full scale range of the transducer. If the problem still exits, then you may have to re-evaluate your pin size or you may need an RJG mold pressure transducer with a higher rated load.

Initial Set-Up

Installation

1. Remove lid cover from DART*PAK*™ case, lift up DART*PAK*™ unit and remove all of the cables from the bottom storage compartment. Insert the power cord into the Power Switch Module. Plug it into a 120 VAC outlet.

2. Attach the Machine Interface cable to the Trigger Input connector on the DART*PAK*™ unit.

3. Wire the trigger connections (as shown in Figure 7) into the molding machine panel using the Machine Interface cable. It is universal, so it can accept either AC or DC "Trigger" inputs. Refer to Figure 7 for the recommended trigger assignments and corresponding color codes. Your Machine Interface cable configuration may have a flat, white 5 Pin Molex connector termination set up to plug into the Mating Harness. These Mating Harnesses can be pre-wired on all machines selected for use with the DART*PAK*™ box providing a convenient plug-in connection at each machine when the box is moved around.

4. Be sure the gain settings on the DART*PAK*™ box correspond to their appropriate channel assignments, check Table 4 for a listing of standard factory settings.

5. Attach the Transducer Input cables to the appropriate channels. **Make sure the transducers are plugged into the correct channels.**

6. Zero all channels connected with the Zero-Enable function, see *DARTPAK™ Components - Front Panel Description - Calibrate/Zero Switch And Enable Push Button* section for this procedure.

7. Plug in the supplied Computer cable into the Com 1 connector, and the other end of the Computer cable into the Com port on the computer. DART*Win*™ defaults to Com Port 1 in its software, if your applications needs this changed, it can be done in the DART*Win*™ software. DART*Win*™*'s Production* Screen - Select *Options* - Select *DARTNET Setup - Options - Comm Port*, then select your desired Comm port number.

Now the hardware should be connected and you are ready to turn on the Power switch and use the accompanying software to collect data.

When connecting a DART*PAK*™ unit to a molding machine, which was hooked up before by one of our conventional PM boxes, be sure the correct Stroke/Velocity cable is used. The newer DART*PAK*™ unit takes a T-520STV-D5 Stroke/Velocity cable, where the conventional PM boxes call for a T-520STV Stroke/Velocity cable to be hooked up to an STX-25V Stroke/Velocity transducer.

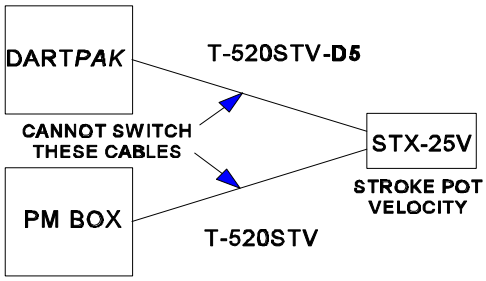


Figure 9

DART*PAK*™ Cabling

Trigger/Power Inputs

The voltage inputs are tapped off of the machine's sequence solenoids as shown in Figure 6. The conventional trigger inputs available from most molding machines consist of:

Pin	Signal	Trigger	Color
1	Injection Forward (Injection Total)	1	Blue
2	Fill (Boost)	2	Pink
3	Screw Run	3	Orange
4	Mold Closed (Mold Open)	4	Brown
5	Trigger Common		Gray

Table 4 - Trigger/Power Inputs

Only Trigger 1 is necessary for allowing the DART*PAK*™ to collect data. Triggers 2, 3, and 4 are solely for additional data collection capability.

AC Power is brought into the box on Pin 6 (115 VAC) and Pin 5 (AC Common.) This

power should come from the Power Transformer on the press.

Control Output Options

There are three control options possible on the DART*PAK*™ box whereby MP1 Control is used to transfer the machine's hydraulics into 2nd stage based on mold cavity pressure. This can be either an Amplified Transducer Signal Output, a Contact Closure Output, or a Low-Level Bridge Output.

Pin	Color	Pigtail End Signal	Signal 2
A	Red	0 - 10 V	+ Sig
B	Black	0 - 10 V	Com
C	White	0 - 20 mV	+ Sig
D	Black	0 - 20 mV	Com
E	Black	Contact Closure	Control Com
F	Green	Contact Closure	Control N.O.

Table 5 - Pin Assignments on the T-DSCP Cable

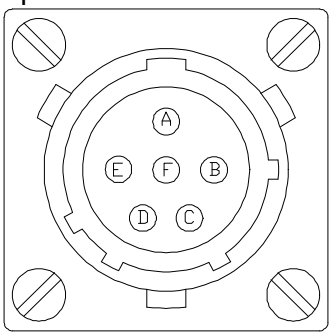


Figure 10

MP1 6 Pin Male Bendix Panel Mount Connector

Amplified Transducer Signal Output

An amplified signal from MP1 Control is available as an option. It is available on MP1 Control Output on the BP panel. On the T-DSCP cable, Pin A is 0 - 10 V and Pin B is 0 - 10 Volts Common. (Reference Table 5) The signal may be wired to a molding machine's controller for cavity pressure control. This option assumes the factory installed machine controller has the capability to let the operator select through its user-interface software the control transfer set-point and the size of the ejector pin being used with the mold pressure transducer, as well as the full scale rated load of the transducer in pounds.

The output level of this signal is 0 - 10 Volts (or 0 - 5 Volts on some models) corresponding to 0 - 2 mV/V full scale from the pressure transducer. When using a mold pressure transducer which is installed under an ejector pin, the full scale pressure will depend on the pin size and the transducer's rated load. The machine's controller will scale the input signal based on the pin size and the transducer's rated load to keep the pressure readings accurate.

When different ejector pins are used, the corresponding pin size should be selected in the machine's controller software setting.

The 0 - 10 Volt DC signal will be sent to the existing process controller on the machine as a mold pressure signal input. The control signal pair of wires is supplied from the DART*PAK*™ box on an individual shielded cable feeding through the flexible conduit with conductors color coded red for the 0 - 10 Volt DC signal and the Signal Common color coded black. These should be connected to the appropriate input terminals on the Machine's A to D card, or process controller board. The minimum load resistance that the control voltage can handle is 1K Ω.

Consult with RJG (616) 933-8137 or your machine representative for further details.

Contact Closure Output

This method of control output is applied to machines which have no capability within the factory-installed machine controller to select control transfer set-points and ejector pin sizes being used with the mold pressure transducers. MP1 Control in this case will be used for energizing the control contacts available on the T-DSCP cable, where Pin E is Control Com and Pin F is Control N.O. (Reference Table 4) Selecting the set-point is accomplished in the DART*Win*™ software. (Reference the DART*Win*™ manual in this binder.)

Maximum Switching Power	3 VA
Maximum Switching Voltage	100 VDC or Peak AC
Maximum Switching Current	0.25 A
Maximum Carry Current	0.40 A

Table 6 - Contact Closure Rating

When MP1 Control pressure reaches the set-point set in the software, a relay inside the DART*PAK*™ box is energized which closes a set of contacts. The contacts can be input to the machine's controller for transferring the machine.

Low-Level Bridge Output

This method of control is applied to machines which have strain-gage transducer signal conditioning already built into the OEM Controller. MP1 Control on the DART*PAK*™ box is fitted with a special bridge-type resistive output wired to a 0 - 20 mV transducer signal on Pins C & D (reference Table 4.) An RJG Control pigtail cable Model T-DSCP plugs into the MP1 Control connector, and the receptacle on the machine's OEM Controller Mold Transducer Input. Sometimes this receptacle is located on a small junction box mounted on the stationary platen.

After connecting the Model T-DSCP cable, the machine's OEM Controller will "think" it is connected directly to the mold transducer. Actually, though the transducer is plugged into the MP1 Control receptacle, (as shown Figure 7) in order to read the sensor signal with the DART system.

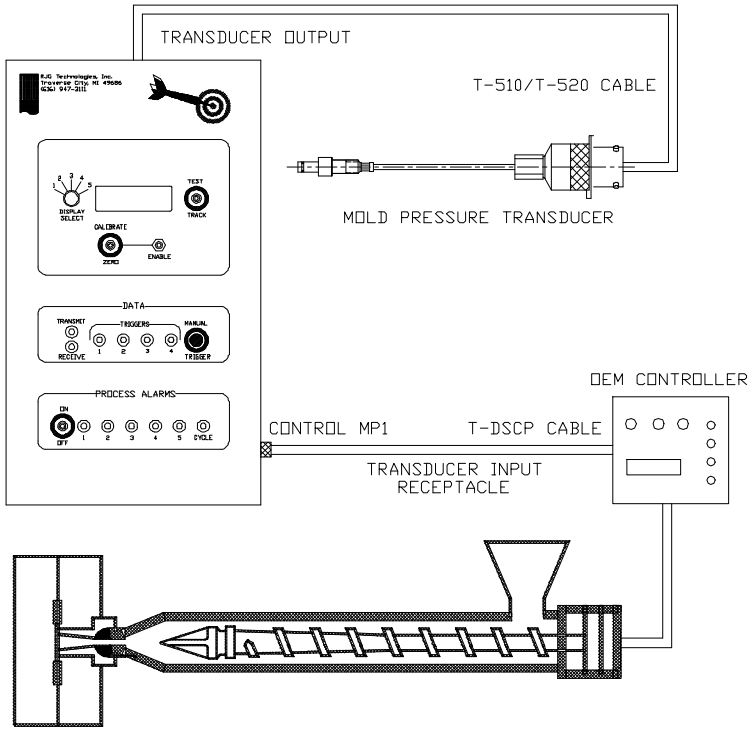


Figure 11

Low Level Bridge Output

Alarm Output

The hardwired alarm output is a set of normally open dry contacts from a relay which when closed can be used to pass power through to light a light, ring a bell, re-sequence a robot, or reverse a conveyor. On the trigger connector, Pins 10 and 11 are the Master Alarms and Pins 15 and 16 are the Cycle Time Alarms. Both sets of N.O. contacts are rated 1/3 HP, 15 amps @ 120 VAC; ½ HP, 10 amps @ 250 VAC or 10 amps @ 30 VDC. The connector pinout is shown in Figure 4. The relay is reset, or de-energized, at the start of injection for the next cycle. The contacts are color coded with blue and yellow conductors.

Interfacing with a Mold Deflection Transducer

The following describes how to interface a T-250 Mold Deflection Transducer to the DART*PAK*™ unit. To properly interface the transducer and DART*PAK*™ will require the selected channel to be rewired using a pair of internally mounted signal selection jumpers. **Failure to do so will result in incorrect or no operation of the mold deflection transducer**. If you are at all hesitant about which jumpers to move or are unwilling to make the required changes to your DART*PAK*™ unit, please call RJG's Technical Service for assistance.

1. Attach a T-520MD cable to the T-250 transducer.

2. Attach the other end of the cable to the channel you have designated for Mold Deflection. The channel's Bendix connector is located on the top panel of the DART*PAK*™.

3. Open the Rear Access door of the DART*PAK*™ unit to change the position of the following jumpers. Move only those channel jumpers which you have selected to interface with the mold pressure transducer. (I.E. If you will be using Channel 3 for mold deflection, move only those jumpers for Channel 3.)

Channel	+ EXC Selection Jumper	- EXC/Ground Selection Jumper
1	JP2	JP1
2	JP4	JP3
3	JP6	JP5
4	JP8	JP7
5	JP10	JP9

Table 7 - Mold Deflection Channel Assignments

Move your selected channel jumpers to the position A-B, respectively. Be sure to include the mold deflection transducer in your DART*Win*™ software setup.

Factory Settings

Unless otherwise specified the DART*PAK*™ is configured with the following channel assignments and associate gain settings listed in Table 5. DART*Win*™ software identifies these settings for your convenience in the *Machine Set-Up* window.

Channel	Assignment	Gain Setting
1	Hydraulic Pressure	250
2	Cavity Pressure	500
3	Cavity Pressure	500
4	Stroke Position	1
5	Ram Velocity	1

Table 8 - Channel Assignments & Gain Settings

Any applications where the mold pressure will be going over 50% of the full scale force rating, you must switch the gain setting from 500 to 250. Otherwise, you will receive potentially invalid data on that mold pressure channel.

An example of going over 50% of the full scale force rating is: Using a Model T-405, which is a 500 lb rated mold pressure transducer, under a 1/4" ejector pin.

The force on the ejector pin at 10,000 psi is 490 lbs, which exceeds ½ of the rated transducer force. Therefore, the gain should be set to 250 for this channel on the DART*PAK*™ box. Once a Gain switch is reset, the user must redo the calibration procedure again, as outlined in *DARTPAK*™ *Components - Front Panel Description - Calibrate/Zero Switch and Enable Push Button* section. The switch is located on the front panel of the DART*PAK*™ box.

*NOTE: Contact a Technical Support representative at RJG Technologies, Inc. at (616) 947-3111 if you are unsure as to what gain setting is required for your mold pressure application.

Software Calibration

DART*Net* (RJG's Conventional DOS Version 2.7 And Above)

Using the DART*PAK*™ with RJG's conventional DART*Net* software (DOS Version 2.7 and above), there is no CAL number to reference when using RJG's *Hydraulic or Mold Pressure Transducers*.

Mold And Hydraulic Transducer Channels

It is only necessary to enter the appropriate *Full Scale* number for the measurements in the DART*Net* software by following this procedure: DART*Net*'s *Production screen - Mold Edit <F4> - Mold Setup <F2> - Miscellaneous <5>,* (as shown in Figure 10) tab over to the appropriate section.

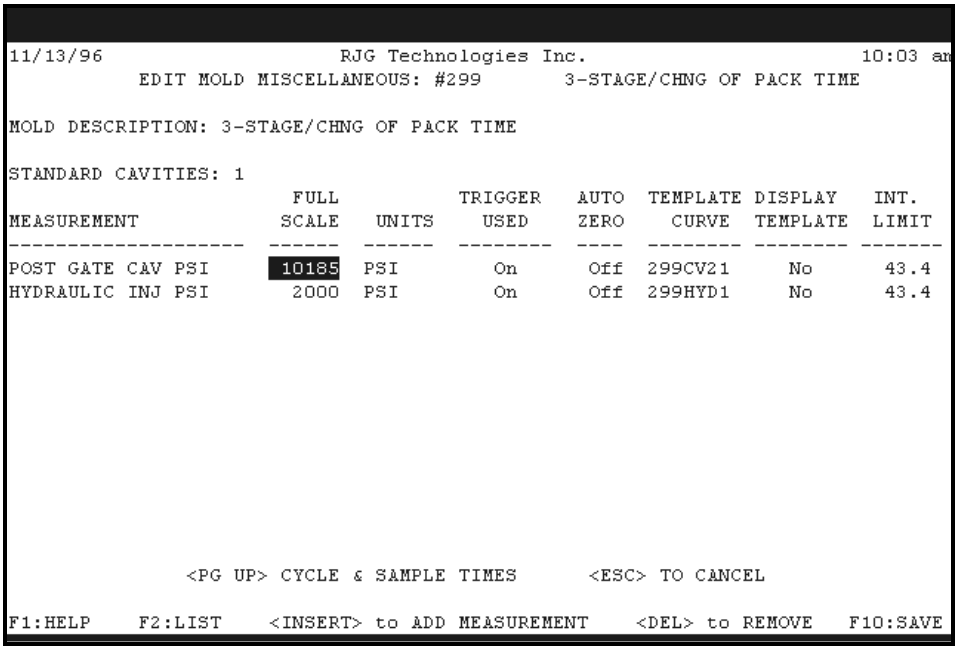


Figure 12

DART*Net's* Hydraulic Scaling Screen

For Hydraulic Transducers, simply enter the corresponding *Full Scale* capacity rating of the transducer, as indicated in Table 9 below:

Model	Capacity
T-2000U T-3000U T-5000U 10KU	2000 PSI 3000 PSI 5000 PSI 10000 PSI

Table 9 - Full Scale Capacity Ratings

When using mold pressure transducers you should derive your *Full Scale Reading* with the following method:

Ejector Pin Load (lbs) ÷ Pin Area (πr^2) = Full Scale Reading

Example: T-405 Transducer (500 lbs)
1/4" Ejector Pin
500 ÷ ($.125^2$ π) = 10185

Enter the number into the *Full Scale* section for the *Mold Pressure Measurement* (as shown in Figure 10) and save with <F10>. Table 10 as standard values already calculated for your convenience.

Ejector Pin	Transducer	CAL# (PSI)	A/O (2V F/S)	A/O (5V F/S)	A/O (10V F/S)

1/16"	T-410/T-414	8905	0.890	2.226	4.452
3/32"		3858	0.396	0.989	1.979
1/16"	T-410/T-414	3562*	0.56	0.891	1.791
3/32"		15829	1.583	3.958	7.915
1/8"	T-405/T-412	8905	0.890	2.226	4.452
5/32"		5699	0.570	1.425	2.850
3/16"	T-405/T-412	3958	0.396	0.989	1.979
1/4"		2226	0.223	0.557	1.113
3/16"	T-405/T-412	15829	1.583	3.958	7.915
1/4"		8905	0.890	2.226	4.452
5/16"	T-405/T-412	5699	0.570	1.425	2.850
3/8"		3958	0.396	0.989	1.979
1/2"	T-405/T-412	2226	0.223	0.557	1.113
N/A		437	0.437	1.093	2.185
N/A	T-405/T-412	655	0.655	1.638	3.275
N/A		1092	1.092	2.730	5.460
	T-406/T-413				
	T-406/T-413				
	T-406/T-413				
	T-406/T-413				
	T-406/T-413				
	T-2000				
	T-3000				
	T-5000				

* Display will read PSI/10.

Table 10 - Ejector Pin & Transducer Calibration Table

Finally, the DART*PAK*™ unit requires you to perform a Zero/Enable and a Calibrate/Enable function as outlined in the *DARTPAK*™ *Components - Front Panel Description - Calibrate/Zero Switch and Enable Push Button* section. The DART*PAK*™ display will then read accurately.

Stroke Position And Velocity Transducers

When using a Stroke Position transducer, first confirm the Gain Setting switch is in the correct position as outlined in Table 8. The next step is to enter the Full Scale Stroke Length of the stroke transducer you are using into the *Full Scale* field: if using the DART*Net* software; from the *Production* screen - *Edit Mold <F4> - Mold Setup <F2> - Miscellaneous* <5>, then use the Arrow keys to move to the *Full Scale* field and enter the length. (Press <ENTER> then <F10> to save these settings.)

When using a Stroke Position transducer with an optional *Velocity Output*, the calibration procedure is identical except the Velocity channel has to be calibrated when the *Velocity Output* is at full scale.

DART*Win*™ (RJG's Windows Version)

Mold and Hydraulic Transducers

After selecting the appropriate transducer model from the Transducer listing in the *Xdcr Scaling* window, the CAL number is automatically derived by the DART*Win*™ software for the mold and hydraulic transducers from this equation: *Full Scale x .2185 = CAL Number*. You will be able to read this number, since it is automatically entered in the Approximate CAL # section in the *Mold Transducer Scaling* window. 8904.8 is the example shown in Figure 13.

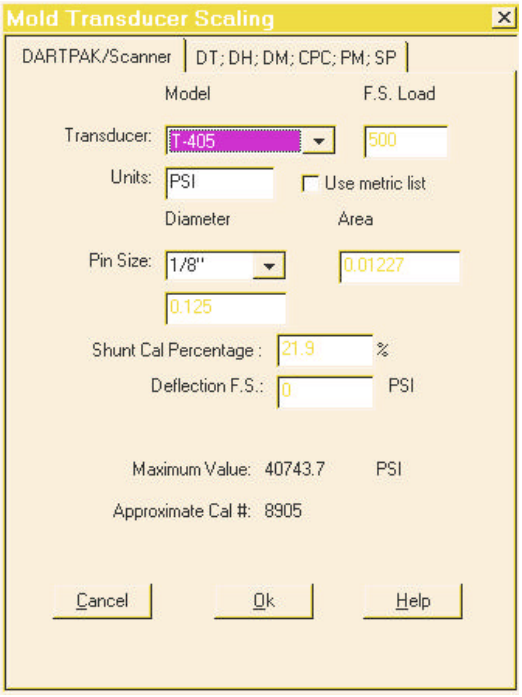


Figure 13

DART*Win*™'s Edit Mold - Transducer Scaling Screen

Stroke Position Transducers

For the Stroke Position transducers (STX-20 or STX-25) read the stroke sensitivity number off of the serial number tag located on the transducer (i.e.: 24.826" @ 5V) and input that number. From the *Production* window, select *Edit - Machine Setup - Add DART*, the *Defaults Measurement* window appears, then select the Stroke Position measurement. Click Ok. This will bring up the *DART* window for the Stroke Position measurement. Enter the Address of this measurement, then click on the *Xdcr Scaling* button, which then displays the *DART Scaling* window. Select the transducer you will be using (STX-20, or STX-25) and enter in the number from the transducer's serial tag in the CAL F.S. and Readout Full Scale box. The Full Scale Stroke / Velocity and Approximate CAL # 's will be automatically calculated. Select Ok to return to the *Machine Setup* window.

Ram Velocity Transducers

For the Ram Velocity transducer (STX-VEL) read the ram velocity number off of the serial number tag located on the transducer (i.e.: 7.814 IPS @ 5V) and input that number. From the *Production* window, select *Edit - Machine Setup - Add DART*, the *Defaults Measurement* window appears, then select the Stroke Position measurement. Click Ok. This will bring up the *DART* window for the Stroke Position measurement. Enter the Address of this measurement, then click on the *Xdcr Scaling* button, which then displays the *DART Scaling* window. Select STX-VEL from the Transducer listing and enter in the number from the transducer's serial tag in the CAL F.S. and Readout Full Scale box. The Full Scale Stroke / Velocity and Approximate CAL # 's will be automatically calculated. Select Ok to return to the *Machine Setup* window.

Troubleshooting

Problem	Solution
1. No Display When The Unit Powers Up / The Display Reads Invalid Data	A. Is the Power cable plugged into an AC wall outlet and the DART*PAK*™ unit and turned "ON" with the ON/OFF switch? B. Disconnect the AC Input cable and check the AC 3 Amp fuse in the Power Input Module. C. Turn the Power switch "OFF"and wait 10 seconds before turning it back "ON." D. Is the channel selected connected to an input? E. Did you autozero all of the connected channels?
2. No Communication Between The Computer And The DART*PAK*™ Unit. Neither The DART Receive Data (Amber), Nor The Transmit Data (Red) Lights Ever Light.	A. Is the D9 Serial cable connected between the Com 1 and the Computer Serial Output? Is Com 1 selected in the DART*Net*/DART*Win*™ software? B. Be sure the DART*Net*/DART*Win*™ software settings correspond to the DART*PAK*™ settings, IE.: Correct DART addresses. (See the software manual for more information.) C. Some bad communications (COMM) cable.
3. Trigger LED's Indicators Are Not Operating Correctly	A. Is the Machine Interface cable connected to the DART*PAK*™ unit? B. Are the Machine Interface cable and the Mating Harness cable connected together correctly? C. Are the triggers installed/wired to the machine correctly? D. More than one DART may be responding to the same address. Check the address. E. Depress the Manual Trigger button, does Trigger 1's LED come on? If yes, verify the machine is sending voltage on the trigger cable during the trigger event. If no, contact RJG's Technical Support staff for more help.
4. No Data Being Displayed On Computer Screen	A. Are the different transducers cables connected to the correct corresponding channel inputs? B. Check transducers for output. (See the Mold Pressure Transducer manual for more information on RJG's mold pressure transducers) C. Are the Trigger LEDs coming on? If they are not, review the previous Problem and Solution.

5.	**Limit Switch Input Does Not Activate The Trigger 1 LED**	A. B. C.	Is the Limit switch cable connected to the Limit switch on the molding machine? Is the Limit switch on the molding machine mounted correctly and functioning properly? Is the Limit switch closing its contact when mechanically activated?
6.	**Display Won't Zero Or Calibrate**	A. B. C.	Verify the Gain switch settings. Possible a defective transducer. Swap transducer cable with an operating channel sensor.
7.	**Process Alarm LED's Are Not Lighting Up**	A.	Are the alarms "ON" in the DART*Net*/DART*Win*™ software? Be sure the alarm values in the DART*Net* or DART*Win*™ software are correct for their corresponding channel assignments.
8.	**No Power Is Coming From The GFCI Duplex Outlet**	A. B. C.	Is the Power cable plugged into an AC wall outlet and the DART*PAK*™ unit? Check to see if the GFCI Duplex Outlet was tripped. The Reset button will be out if it was tripped. Push the button in to restore the power. Determine if the external equipment plugged into the GFCI Duplex Outlet is tripping the outlet.
9.	**When using a DART*PAK*™ to monitor Mold Pressure, the curve displayed in the DART*Win*™ software seems to be pressure limited, or "chopped off" at the half scale value of the transducer**	A.	Check the Gain switch position for that channel. The standard Gain switch position for a DART*PAK*™ channel with an MPT input is High Gain [500]. This is because it provides the best resolution for most applications. However, if your pressure climbs above the transducer's half scale, the measurement will "peg out" or plateau at the half scale level. In the software this will manifest itself in a curve that seems to have its top cut off. If this happens, changing that channel's Gain switch to mid Gain [250] and re-calibrating that channel will give you the full scale range of the transducer. If the problem still exists, then you may have to re-evaluate your pin size or you may need an RJG mold pressure transducer with a higher rated load.

10.	**When using a DART*PAK*™ to monitor Hydraulic Pressure, the curve displayed in the DART*Win*™ software seems to be pressure limited, or "chopped off" at less than the half scale value of the transducer**	A.	Check the Gain switch position for that channel. The standard Gain switch position for a DART*PAK*™ channel with a hydraulic input is Mid Gain [250]. If by mistake the Gain switch is set to High Gain [500], the measurement will "peg out" or plateau at the half scale level if your pressure climbs above the transducer's half scale level. If this happens, changing the channel's Gain switch to Mid Gain [250] and re-calibrating that channel will give you the full scale range of the transducer. If the problem still exits, then you may need an RJG hydraulic transducer with a higher rated load.
		B.	Your hydraulic pressure may indeed be pressure limited. Check your hydraulic system specifications to determine the maximum pressure it can provide.

Contact a Technical Support representative at RJG Technologies, Inc. if the problem still persists at (616) 947-3111.

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