Batch Blender User Manual

TSM Sigmabatch
Installation Manual
Version 5

Instant Access
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Date:	
Manual Number:	
Serial number(s):	
Model number(s):	

Please record your equipment's model and serial number(s) and the date you received it in the spaces provided.

Introduction

Quick Start

Extrusion control

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Operation

User Manual

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Maintenance

Troubleshooting

Appendix

Software update

Purpose of the manual

It contains important instructions on the **correct** operative and maintenance of the blender. Follow these instructions to **avoid dangers**, to prevent expensive down time and to increase the service life of the blender.
The manual must be kept for referral with the blender at its place of use.
The manual must also accompany the blender if it is rented or sold.
It is directed to people who operate and repair the blender and must be read, understood and used by every person who is responsible for the following work with the blender:

• Transport and instillation,
• Operation,
• Maintenance and repair,
• Fault finding,

Take particular note of
• The chapter containing the warning notes in the manual.

Layout of the manual
This manual is classified into several main parts:
• User information,
• Safety,
• Technical specifications,
• Transport and setup,
• Structure and function,
• Operation,
• Maintenance and repair,
• Decommissioning and disposal,
• Appendix (menu structure).

TSM design equipment with the user's safety in mind. You can avoid potential hazards identified on this machine by applying common sense safety precautions and by following the procedures outlined below and elsewhere in the Operator Guide.

Meaning of safety information

Safety instructions are placed before the work steps. Read **the** safety instructions carefully before carrying out the subsequent operation. If safety instructions are not followed, serious personal injury - possibly with fatal results - and property and environmental damage may occur!
The safety instruction in this operating manual are indicated with a symbol. The symbol contains a signal word indicating how serious the danger is.

WARNING. Improper installation, operation or servicing may result in personal injury or equipment damage.

This equipment should be installed, adjusted, and serviced by qualified technical personnel who are familiar with the construction, operation and potential hazards of this type of equipment.

All wiring disconnects and fuses should be installed by qualified electrical technicians in accordance with electrical standards and codes in your region.

Always maintain a safe earth connection. Do not operate the equipment at power levels other than what is specified on the equipment serial number tag and data plate.

WARNING: Electrical shock hazard

This equipment is powered by single-phase and/or three-phase mains voltage, as specified on the machine serial tag and data plate.

A properly sized conductive earth wire from the incoming power supply must be connected to the chassis earth terminal. Improper earthing can result in personal injury and erratic machine operation.

Only qualified personnel should perform troubleshooting procedures that require access to the electrical enclosure while power is on.
Always disconnect and lock out the incoming main power source before opening the electrical enclosure or performing non-standard operating procedures, such as troubleshooting or routine maintenance.

WARNING: Do not remove or disable safety devices

Electrical interlocks are installed on the mixing chamber and material bin doors to prevent blender operation when the doors are opened. (if the bins have not fitted with finger guards)

WARNING: Pinch hazard

This equipment is equipped with pneumatic slide gates, which are mounted on the blender frame beneath the material bins. Always disconnect and lock out the incoming compressed air and electrical power supplies before working near these slide gates. Failure to do so could result in serious injury. The material bins are equipped with finger guards. These should never be removed unless adequate precautions are taken to secure the Perspex door on the bin. It is recommended a safety interlock is fitted to the door or at least that the thumb screw is removed and replaced with a security bolt to prevent any unauthorized person opening the door.

WARNING: Rotating auger hazard

The mixing chamber and additive feeders on some TSM blenders contain rotating augers. Always stop the blender and disconnect the main power supply before opening the mixing chamber or opening the feeder drain door. Rotating augers can cause serious injury

CAUTION: Flying objects

TSM blenders are equipped with a compressed-air gun that can be used for cleaning the bins and mix chamber. To avoid potential injury, you must observe all safety regulations that apply to the use of compressed air for cleaning equipment.

Adjust air pressure to no more than 7.5 Bar (110 PSI.).
Wear protective goggles and clothing to prevent injury from flying particles and objects.

TSM has made every effort to prevent injury to prevent injury by installing the following safety devices

Door interlock: The **ACCESS DOOR** is equipped with a safety interlock switch that prevents the mix motor from running and the slide valves from operating.
DO NOT defeat this safety switch

HOPPER FINGER GUARDS
Finger guards are fitted into each hopper compartment.
DO NOT: reach through these guards.
DO NOT: use your fingers to clear an obstruction below these guards.
DO NOT remove these guards.
If it is necessary to remove the finger guards then it is necessary to install interlock switches on easily opened windows. If this is not possible then the thumb screw should be replaced with a security bolt to prevent any unauthorized access

Motor finger guard: A finger guard has been fitted around the motor shaft to prevent injury.
Electrical enclosures have been secured so that it is necessary to use a tool to open them.

How to Use the Lockout Device

Only qualified electrical personnel should attempt to carry out electrical maintenance on this product. Before performing maintenance or repairs on this product, you should disconnect and lock out electrical power sources to prevent injury from unexpected energisation or start-up.

Lockout is the preferred method of isolating machines or equipment from energy sources.
Depending on the blender mode TSM three phase blenders have been equipped with the lockout device pictured below. To use the lockout device on
Optimix 350/650/1000/1500/3000

- Stop and switch the equipment off.

- Isolate the equipment from electrical power.

- Turn the rotary disconnect switch anti-clockwise to '**Off**' position.

- Secure the device with an assigned lock or tag.

  - The equipment is now locked out.
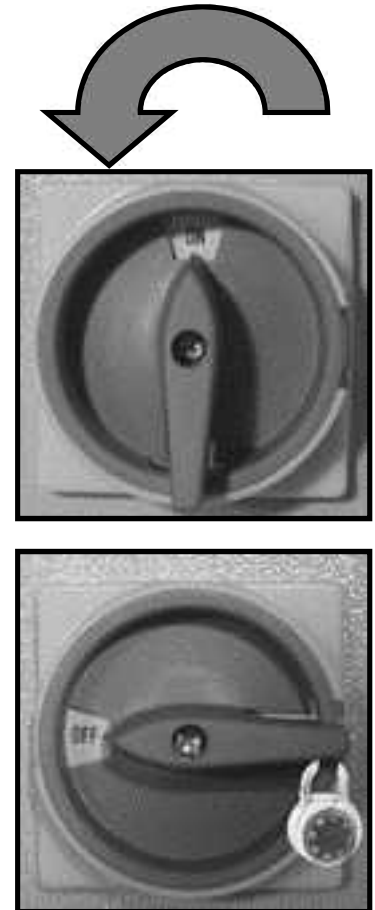
The single phase Blenders
The single phase blenders **are not supplied with a lockout switch** so they should be powered off and the power cable removed before any electrical work is carried out.
TSM recommends that the single phase blenders are connected using a customer supplied lockout switch.

WARNING: Before removing lockout devices and returning switches to the ON position, make sure that all personnel are clear of the machine, tools have been removed and all safety guards reinstalled.

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Description

How It Works

Operator touch panel.

Production Summary

Using the touch screen panel, the operator enters the recipe as a percentage of each component or material.

When it is started the blender will start the mixing motor, Close the weight hopper and open the slide valves in turn to dispense the correct percentages of each material one at a time. The blender will start by filling the largest component first. When the level sensor in the mixing chamber becomes uncovered the batch will drop and the cycle will start again.

Operator Touch panel.

Up to Eight main Material Bins - depending on Model Located above the blender frame and slide valves, these bins contain the material to be deposited into the weigh hopper for blending.

Viewing Windows
Clear visibility of material levels in the bins.

Pneumatic slide valves One slide valve is located inside each material bin for dispensing material into the weigh hopper. (The openings can be different sizes depending on the percentages required)

Load Cell (above weigh hopper) The load cell converts the mechanical force of the material load into an electrical signal. Since the load cell is a delicate transducer, it should be treated carefully and should not be subjected to severe mechanical shocks.

Mix Chamber Access Door. The lockable, hinged access doors allows you to see the batching cycle. A safety interlock inhibits operation of the slide gates and mixing mechanism.

Control Consoles
All electric's and pneumatics required for operating the fill valves and mixing motor are located in the electronics consoles mounted at the rear of the blender frame.

Access window door The material bins are equipped with finger guards.

These should never be removed

Unless adequate precautions are taken to secure the Perspex door. (see page 4)

Removable Hoppers
The Opti-mix has been designed with its dispensing valve incorporated into the hopper. To remove the hopper the operator simply releases the two air supply quick release connections. Emptying and cleaning the hopper can be completed in less than a minute due to the unique design.

Mixing Auger

Auger Mixing Chamber When uncovered, a level sensor inside the mixing chamber signals for more material. Material drops into the mixing chamber, where the mix auger runs continuously. The patented, positive- displacement, reverse mixing auger provides improved uniformity of the blend, with no material separation. The auger is removable, without tools, for easy

Removable Weigh Hopper
A bracket attached to the load cell supports the weigh hopper. All material that enters this hopper is weighed; therefore the hopper must sit freely on this bracket with no obstructions in any direction. The dump flap and accompanying piston should be visible when looking through the transparent door of the blender. The weigh hopper slides out for easy cleaning.

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Features and Options

The Operator touch panel allows navigation through the system. Refer to main user guide for details.

Features:
7" TFT Widescreen
Resolution 800x480 pixels
Touch screen Type: 4 wire analog restive.

- Simplified operator screens. Enter and store blend recipes by percentage of components. On completion of one job, east transition to the next job and recipe.

- Real time production status report summaries are available. Setpoints, actual weights per component and average throughput are also available. For extrusion purposes the total length, thickness, roll and order reports can be displayed. Printed reports include time, date, order number and material usage.

- Password protection of all blending system parameters.

- Remote mounting. Supplied with 3 meters (10 Ft.) of cable (standard).

Material Flow Reducers (specified at time of order) may be fitted to the material bin slide valves to improve the dispensing accuracy of components with small target weights. Please refer to section **IN-17** for more information.

Flow Control Valve (off-line blending)
A pinch or flow control valve must be installed between the mixing chamber discharge and the container or distribution system. This valve ensures proper mixing by controlling the material flow from the mixing chamber.

For Extrusion Applications

Serial Extruder Interface (yield control option)
Used for on-line blending with extrusion control:

The module connects the blender to the extruder
controls, line speed device and roll change switches. It
should be mounted in the extruder control cabinet where
it will be easily accessible to TSM engineers, for
diagnostics and servicing.

Line Speed Encoder (optional weight-per-length control) measures the
film speed and the length of film produced. The line speed device should
be mounted on a film driven roller as close to the winder as possible.

Roll Change Inputs (for customer-supplied switches)
The system is equipped with two reel change inputs, one for each of the front and back
winders. These inputs can be connected to two normally open switches. The switches
momentarily close (connecting to ground) whenever a roll change occurs.

The switches can be microswitches that are activated automatically by the removal of the roll
or the cutting mechanism, or a manually operated push button used by the operator.

The latter method is prone to errors from delays in pushing the buttons. If the winder is
equipped for automatic roll changes then spare relay contacts are usually available from the
roll change mechanism.

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Specifications
TSM SigmaBatch Blender

Optimix 50/150

Number of Components	Optimix 50/150	
	4 Slide Gates No Side Feeders	
Dimensions from drawing	**mm**	**inch**
A	652	23.90
B	652	11.81
C		11.81
D		14.57
E	440	15.55
F		30.12
G		
Blender Weight	50Kg	N/A
Throughput (per hour*)	50/150 kg 110/330 lbs.	
Batch Size	0.6/0.8 kg 1.3/1.7 lbs.	
Max Components	4	
Discharge Valves	4	
Max screw Feeders	N/A	
Power Consumption	0.15KW	

OPTIMIX50/150
(Top view)

*Specification Note:
Maximum throughput rates are based on using all dispense valves using standard material. Use of feeders will reduce this rate.

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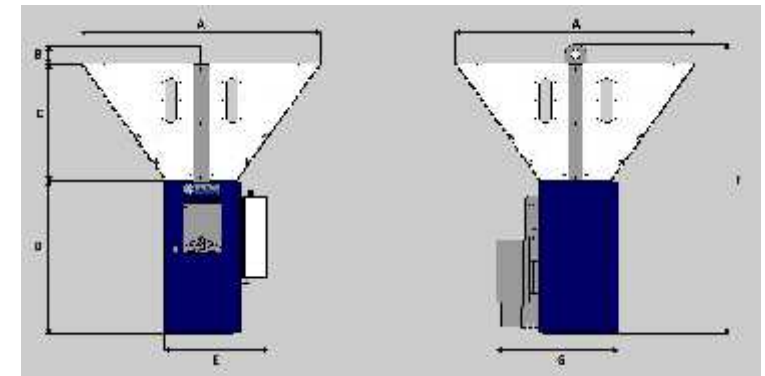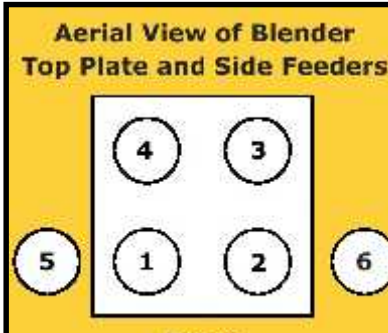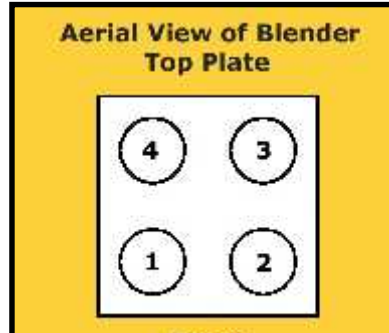
Blender Component Configuration

<div align="right">

Specifications
TSM SigmaBatch Blender

</div>

Optimix **3000**	Optimix **1000**	Optimix **650**	Optimix **350**

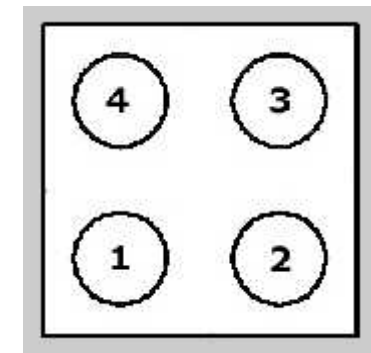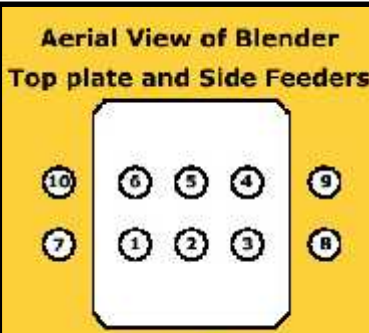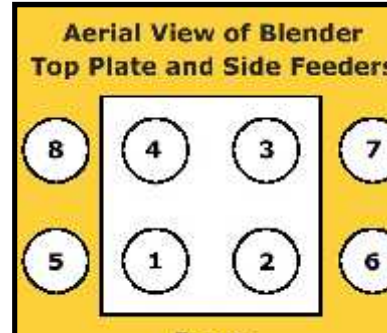Aerial View of Blender Top plate and Side Feeders — Front

Aerial View of Blender Top Plate and Side Feeders — Front

Aerial View of Blender Top Plate and Side Feeders — Front

Aerial View of Blender Top Plate — Front

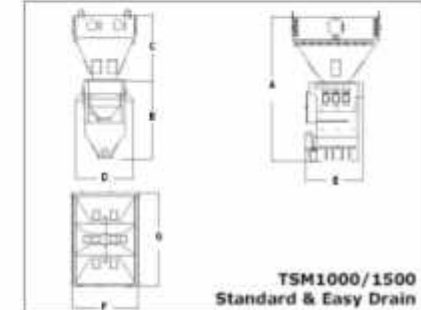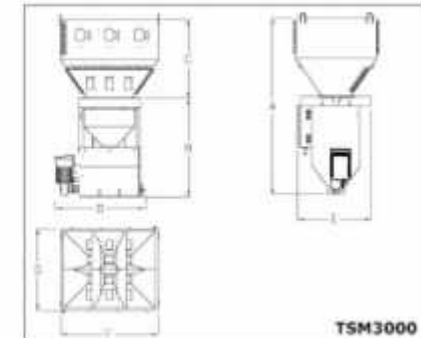|	Optimix 350		Optimix 650		Optimix 1000		Optimix 1600		Optimix 3000	
Number of Components	**4 Slide Gates** **No side feeders**		**4 Slide Gates** **+ up to 2 side feeders**		**4 Slide Gates** **+ up to 4 side feeders**		**4 Slide Gates** **+ up to 4 side feeders**		**8 Slide Gates** **+ up to 4 side feeders**	
Dimensions from drawing	**mm**	**inch**	**mm**	**inch**	**mm**	**inch**	**mm**	**inch**	**mm**	**inch**
A	610	24	610	24	610	24	610	24	1000	39.4
A1	N/A	N/A	640	25.2	760	29.9	760	29.9	840	33.1
A2	N/A	N/A	1435	56.5	1620	63.8	1620	63.8	1770	69.7
B	400	15.7	400	15.7	500	19.7	500	19.7	810	31.9
C	600	23.62	695	27.36	875	34.45	1075	42.32	1130	44.49
D	1000	39.4	1095	43.1	1375	54.1	1575	62	1940	76.4
E	522	20.55	522	20.55	681	26.81	681	26.81	903	35.55
Throughput (per hour*)	300 kg 660 lbs.		650 kg 1430 lbs.		1000 kg 2200 lbs.		1600 kg 3530 lbs.		3000 kg 6610 lbs.	
Batch Size	2 kg 4.4 lbs.		4 kg 9 lbs.		7 kg 15 lbs.		12 kg 26 lbs.		25 kg 55 lbs.	
Max Components	4		6		8		8		10	
Discharge Valves	4		4		4		4		8	
Max Micradose Feeders	0		2		4		4		4	

TSM Gravimetric Batch Blender Specifications

MODELS	TSM-OPTI	FIBRE	TSM350-S	TSM350-E	TSM650-S	TSM650-E	TSM1000-S	TSM1000-E	TSM1500-S	TSM1500-E	TSM3000-S	TSM3000-T
Performance Characteristics												
Batch Size (kg)	0.8	2	2	2	4	4	7	7	12	12	25	25
Maximum Throughput (kg/hr)***	150	250	350	350	650	650	1000	1000	1500	1500	3000	1850
Hopper Bin Capacity – Each (Litre)	12	14	22	35	22	35	32	90	32	90	60	110
– Hopper Bin Option 1	– N/a –	14 / 50**	92	– N/a –	92	– N/a –	98	– N/a –	98	– N/a –	110	– N/a –
Standard Components	4	4	4	4	4	4	4	6	4	6	6	8
Additional Components	– N/a –	2	2	2*	2	2*	4	2*	4	2*	4	4
Easy Drain	– N/a –	– N/a –	– N/a –	Standard	– N/a –	Standard	– N/a –	Standard	– N/a –	Standard	– N/a –	– N/a –
Colour	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
Auto Cleaning – 1 Stage	Option	– N/a –	Option	Option	Option	Option	Option	Option	Option	Option	Option	Option
Auto Cleaning – 2 Stage	Option	– N/a –	Option	Option	Option	Option	Option	Option	Option	Option	Option	Option
Auto Cleaning – 3 Stage	– N/a –	Standard	Option	Option	Option	Option	Option	– N/a –	Option	Option	Option	Option
Standard Valve Sizes (mm)	4 x 50	2x50 / 2 x MD	2x75 / 50 / 38	2x75 / 50 / 38	2x75 / 50 / 38	2x75 / 50 / 38	4 x 75	4x75 / 2 x 50	4 x 75	4x75 / 2 x 50	6 x 100	8 x 75
Offline Valve Size (mm)	50	50	50	50	50	50	75	75	75	75	75	75
Bridge Breaker Type	Vibrator	Vibrator	Vib / Agit	Vib / Agit	Vib / Agit	Vib / Agit	Vib / Agit	Vib / Agit	Vib / Agit	Vib / Agit	Vib / Agit	Vib / Agit
Mix Screw Motor (phase)	1	3	3	3	3	3	3	3	3	3	3	3
Mix Screw Motor (HP)	0.2	0.2	0.2	0.2	0.2	0.2	0.36	0.36	0.36	0.36	1.0	1
Mix Screw Motor (KW)	0.15	0.15	0.15	0.15	0.15	0.15	0.27	0.27	0.27	0.27	0.75	0.75
Blender Weight (Kg)	50	85	75	100	80	115	115	190	125	200	210 / 225	225
Max Ambient Operating Temp (°C)	50	50	50	50	50	50	50	50	50	50	50	50
Max Material Temp (°C)	70	70	70	70	70	70	70	70	70	70	70	70
Max Optional Material Temp (°C)	130	130	130	130	130	130	130#	130	130	130	130	130
Mix Chamber Discharge Hole (mm)	50	50	50	50	50	50	75	75	75	75	75 (100)	75 (100)
Dimensions												
A – Blender Height (mm)	737	1287	978	1137	1043	1201	1415	1688	1465	1738	1820	1820
B – Mixing Chamber Height (mm)	413	585	585	631	650	696	913	913	965	963	1010	1010
C – Hopper Bin Height (mm)	324	379	393	506	393	506	500	775	900	775	810	810
C₁ – Hopper Bin Height (mm)	N/a	729**	750	– N/a –	750	– N/a –	753	– N/a –	753	– N/a –	810	– N/a –
D – Blender Front Width (mm)	205	670	563	620	563	620	470	669	470	669	894	894
E – Blender Side Width (mm)	333	520	520	520	520	520	680	680	680	680	761	761
F – Hopper Bin Front Width (mm)	652	631	610	750	610	750	610	700	610	700	1000	1350
F₁ – Hopper Bin Front Width (mm)	N/a	1006	900	– N/a –	900	– N/a –	900	– N/a –	900	– N/a –	1350	– N/a –
G – Hopper Bin Side Width (mm)	652	652	610	750	610	750	1000	610	1000	610	840	1000
G₁ – Hopper Bin Side Width (mm)	N/a	741**	900	– N/a –	900	– N/a –	900	– N/a –	900	– N/a –	1000	– N/a –
Shipping Details												
Box Size (LxWxH cm)	120x80x90	170x100x100	120x80x90	120x80x90	120x80x90	120x80x90	170x100x100	170x100x100	170x100x100	170x100x100	2x(170x100x100)	2x(170x100x100)
Box Weight w/ Blender (kg)	80	120	100	135	100	140	160	235	175	245	150 + 100	150 + 150
Voltages Offered (w/ running load amps)												
220V / 240 – 1Ø – 50/60 Hz	1.25 A	– N/a –	– N/a –	– N/a –	– N/a –	– N/a –	– N/a –	– N/a –	– N/a –	– N/a –	– N/a –	– N/a –
220V / 240 – 3Ø – 50/60 Hz †	– N/a –	1.1 A	1.1 A	1.1 A	1.1 A	1.1 A	1.6 A	1.6 A	1.6 A	1.6 A	4.15 A	4.15 A
380V / 410 – 3Ø – 50 Hz †	– N/a –	0.75 A	0.75 A	0.75 A	0.75 A	0.75 A	1.0 A	1.0 A	1.0 A	1.0 A	2.5 A	2.5 A
440V / 460 – 3Ø – 60 Hz †	– N/a –	0.75 A	0.75 A	0.75 A	0.75 A	0.75 A	1.0 A	1.0 A	1.0 A	1.0 A	2.5 A	2.5 A
Compressed Air Requirements (based on standard component configuration)												
Discharge, Venturi & Dump Valves	6 – 8 Bars (90 – 120 psi)											
Air Consumption (cft/min)	0.02	0.45	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.05	0.05

SPECIFICATION NOTES:

- Maximum through-put rates are based on using all dispense valves. Using side feeders (screw or venturi) will reduce this throughput rate below the stated maximum.
- Feeders will increase width & depth dimensions. Please contact TSM for further information.
- Screw Feeder Motors come in 110V (AC) and 220/240V (AC) type – requires an additional 1 amp @ 110V or 0.5 amp @ 240V and not available on all TSM batch blenders.
- The height of each blender will be increased with the addition of a flange adaptor or neck flange.
- Specifications may change without prior notice. Contact TSM for more information.
- Bolts and washers included if neck or adaptor is purchased. Blank plate provided by TSM for necks if no sensors / valves are purchased.

*   Additional Components are using Micradose™ Side Feeders – No Screw Feeders available on any Easy Drain.
**   The Fibre Batch optional bins are configured with small Micradose™ feeders on the front with larger bins on the back 2 components. Dimensions shown are overall size of all four bins combined.
***   Throughputs specified are upper limits for 4 components only with standard valve sizes – allow 20% margin. For 4+ components use throughput calculator.
†   The TSM 3-Phase blenders require 5-Core cable for electrical connection – 3Ø for the motor and 1 earth and 1 neutral for controller.
#   The TSM1000-S is available in a special high temperature version for handling high temperature PET. Contact TSM for more details.
N1   The batch size listed for each blender is based on 0.9 bulk density. Any variation in bulk density will change the blender throughputs so contact TSM if bulk density changes.
N2   Throughputs and blender operation are based on using free flowing materials. Any regrinds must first be discussed with TSM to evaluate the machine operation.
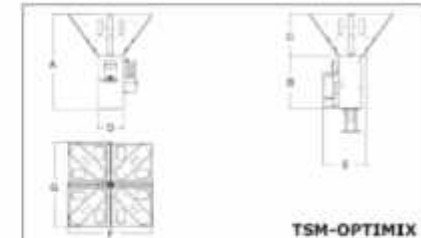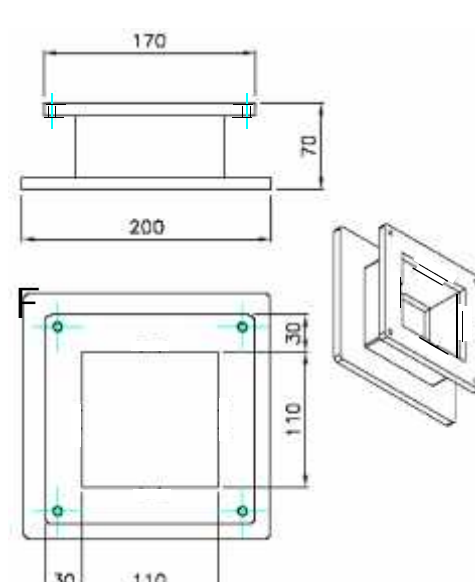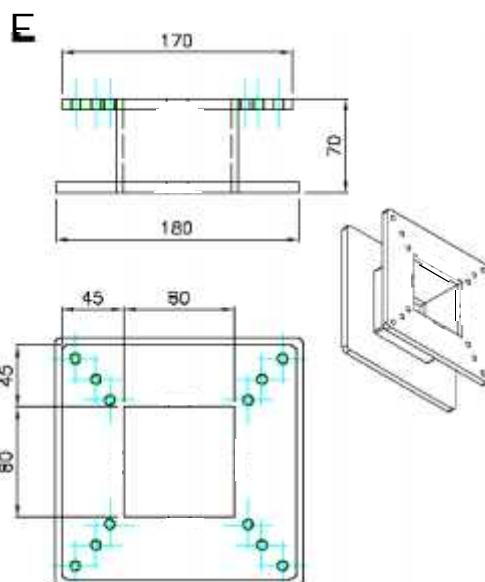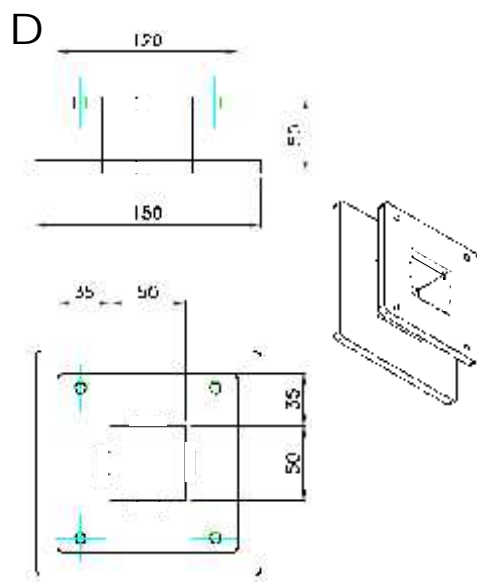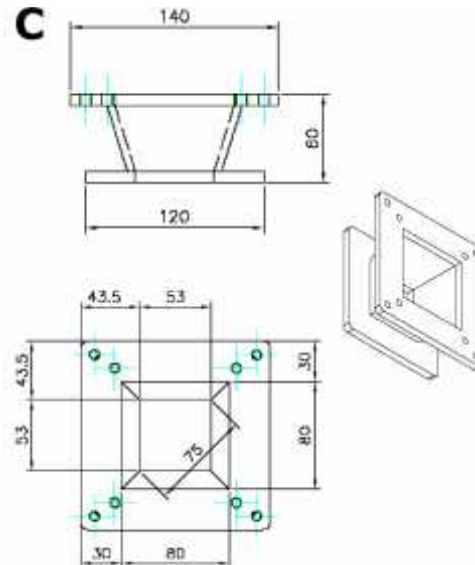
TSM-OPTIMIX
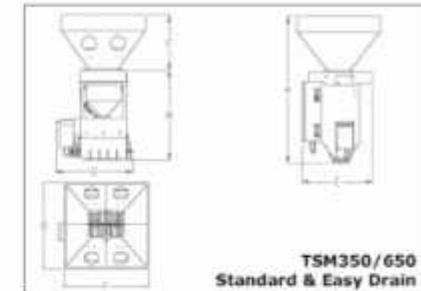
TSM350/650
Standard & Easy Drain

TSM1000/1500
Standard & Easy Drain

TSM3000

Adaptor Options

A

B

C

D

E

F

Neck Options

I

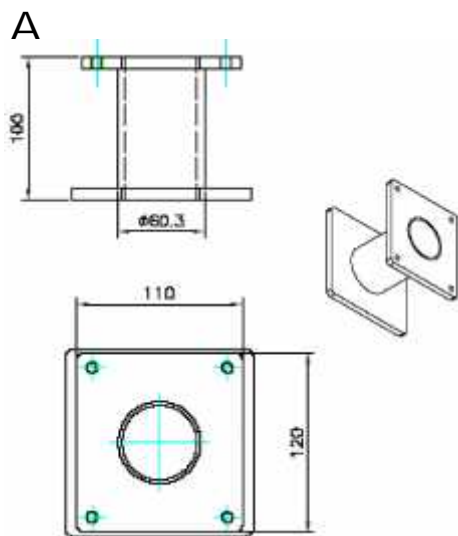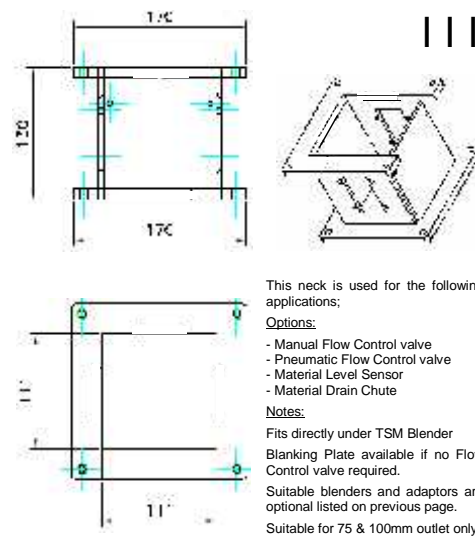This neck is used for the following applications;

Options:
- Manual Flow Control valve
- Pneumatic Flow Control valve
- Material Level Sensor
- Material Drain Chute

Notes:

Fits directly under TSM Blender

Blanking Plate available if no Flow Control valve required

Suitable blenders and adaptors are listed on previous page

Suitable for 50mm outlet only

II

This neck is used in applications where the TSM Material By-Pass system and Automatic Cleaning is required.

Options:
- Pneumatic Flow Control valve
- Material By-Pass
- Material Level Sensor
- Material Drain Chute

Notes:

Fits directly under TSM Blender

No Blanking Plate required

Suitable adaptors and Blenders are listed on previous page.

Suitable for 50mm outlet only

III

This neck is used for the following applications;

Options:
- Manual Flow Control valve
- Pneumatic Flow Control valve
- Material Level Sensor
- Material Drain Chute

Notes:

Fits directly under TSM Blender

Blanking Plate available if no Flow Control valve required.

Suitable blenders and adaptors are optional listed on previous page.

Suitable for 75 & 100mm outlet only

Blender Element check list

Reservoir Bin

Blender Frame

Weigh hopper

Fig 1.1

Example of Standard batch

Operator touch screen. Fig 1.3

Micro dose feeder (optional)

NBB electronics Console

The following chart shows all parts available for the Sigmabatch range of blenders.

	Optimix 50/150	Optimix 250	Optimix 350	Optimix 650	Optimix 1000	Optimix 3000 Optimix 1500
Blender Frame Complete *(Reservoir bin + control cabinet included)*						
Weigh Hopper						
`Operator Touch panel (fig 1.3)						
Air Gun						
Manual						
Side Feed Auger + Bin	--					
SEI						
Line speed Encoder						
Offline Kit						
Offline Stand						
Offline Bin						

Legend:

Supplied as standard.
Optional extra's.

Mounting Equipment

Lifting hook in
SHIPPING position

1. **Gently** remove the Batch Blender from the box using the lifting hooks provided on the top of the blender frame   (*No lifting hooks on smaller blenders*).
2. Position, secure and bolt the blender onto the processing machine or stand. Allow easy access to the mixing chamber door for cleaning purposes.

It is the responsibility of the user to ensure that the blender is supported laterally as required to avoid excessive deflection on the neck during operation.

3. Change the bin lifting hooks into the correct position for lifting as shown above.
4. Mount reservoir bin on top of blender frame as in **Fig 1.1**.
5. *If applicable, mount material loading equipment on top of reservoir bin.*

6. **Gently** position the weigh hopper onto the bracket in the mixing chamber - taking care not to damage the weigh mechanism/ loadcell.

6. Connect the air pipe to the weigh hopper piston. (Push fit)
7. Mount the operator touch panel (**Fig 1.3**) in an appropriate location for the user.

8. Connect remote operator panel to D type connector that is connected to the SBB200-1 electronics module in the blender control cabinet.

Note:

Please ensure that the acrylic door of the blender is kept closed during its unpacking and mounting. This will help prevent damage to the delicate weigh mechanism/ load cell.

The Remote Operator Touch panel requires careful handling

Connecting Power

The 3 phase power should be connected to the terminals as shown below

European					USA				
(380 V/410V 50 Hz 3					(460VAC 3 60Hz + Earth) (110V 1 60Hz +Neutral + Earth)				
GND	L1	L2	L3	N		GND	L1	L2	L3
5	1	2	3	4	3	5	1	2	3
					1	HOT 6/7	N 8	GND 9	

Blender Type	Power Consumption(KW)
Optimix 50/150	0.2 (1) (4.5A@110v) (2.5A@220v)
Optimix 250	0.2 (1)
FIBRE	0.15 (3)
Optimix 350	0.15 (3)
Optimix 650-S	0.15 (3)
Optimix 1000-S	0.27 (3)
Optimix 1500-S	0.27 (3)
Optimix 3000-S	0.75 (3)

Connect power to the blender. If the 3 mains voltage available is greater then 440 VAC, then an additional single phase supply is required as per USA wiring shown in the Maintenance section..

The single phase power

The single phase power is wired into the connector on the side of the NBB electronics enclosure. There is approximately 3 meter IEC cable supplied with the blender and the colors are shown below.

Live	Brown
Neutral	Blue
Earth	Yellow/green

Connecting Oil Free Air Supply

Air In **Regulator Cap**

Type	Bar	PSI
All blender sizes	8	110

- Connect **oil-free** compressed air supply to the blender: The regulator is set at 7.5 bar (110 P.S.I.)
- **European:** 8 mm push-fit pipe
- **USA**: $^1/_4$ inch push fit pipe

Set the air pressure as follows.
- Connect compressed air supply by inserting piping into available port on regulator.
- Pull cap upwards to unlock.
- Twist cap in a clockwise direction to increase the pressure.
- When the correct pressure is set, push the cap back down to secure.
- The water trap needs to be checked regularly and drained accordingly.

Standard Blender configuration for Customer Throughput Requirements

When the TSM Sigmabatch blender leaves the factory it is set to a standard configuration - unless specified otherwise by the customer. The tables below show standard slide valve size configurations.

If a lower % is required for any component, the appropriate insert (medium - 50mm /2 inch) or small - 38 mm /1.5 inch) must be inserted.

 Please refer to page12/13 for the physical layout of the standard material bins for the TSM blender range

Optimix 50 Batch size.6Kg				Optimix150 Batch size .8Kg
COMPONENT NO.	MIN %	MAX %	SLIDE VALVE SIZE	INSERT
1	10.0	100	40mmx50mm	None
2	10	70	40mmx50mm	None
3	0.6	30	Restricted	Restricted
4	0.6	30	Restricted	Restricted

Optimix 250 Batch Size 1.2Kg				
COMPONENT NO.	MIN %	MAX %	SLIDE VALVE SIZE	INSERT
1	10.0	100	40mmx50mm	None
2	10	70	40mmx50mm	None
3	0.6	30	Restricted	Restricted
4	0.6	30	Restricted	Restricted

Optimix 350 batch size 2Kg				Optimix 650 Batch Size 4Kg
COMPONENT NO.	MIN %	MAX %	SLIDE VALVE SIZE	INSERT SIZE
1	10	100	75mm	None
2	5.0	100	75mm	Medium (50 mm)
3	5.0	70	50mm	None
4	0.6	15	50mm	Small (38mm)

TSM

Optimix 1000 Batch Size 7.5Kg			Optimix 1600 Batch Size 12Kg	
COMPONENT NO.	*MIN %*	*MAX %*	*SLIDE VALVE SIZE*	*INSERT SIZE*
1	10.0	100	75mm	None
2	10.0	100	75mm	None
3	5.0	70	75mm	Medium (50mm)
4	0.5	15	75mm	Small (38mm)

Optimix 3000 Batch Size 25Kg 6 component model				
COMPONENT NO.	*MIN %*	*MAX %*	*SLIDE VALVE SIZE*	*INSERT SIZE*
1	10.0	100	100mm	None
2	10.0	100	100mm	None
3	10.0	100	100mm	None
4	10.0	100	100mm	None
5	10.0	100	100mm	None
6	0.2	15	100mm	Medium (50mm)
If small insert is used	0.1	15	100mm	Small (25 mm)

Optimix 3000 Batch Size 25Kg 8 component model				
COMPONENT NO.	*MIN %*	*MAX %*	*SLIDE VALVE SIZE*	*INSERT SIZE*
1	10.0	100	75mm	None
2	10.0	100	75mm	None
3	10.0	100	75mm	None
4	10.0	100	75mm	None
5	10.0	100	75mm	None
6	10.0	100	75mm	None
7	10.0	100	75mm	None
8	10.0	100	75mm	None
If medium insert is used	0.2	15	75mm	Medium (50 mm)
If small insert is used	0.1	15		Small (25 mm)

General wiring considerations

Full Wiring Diagrams are provided in **TSM BATCH BLENDER USER MANUAL (maintenance section).**

The wires connecting the various elements of a TSM system are normally communications/ data lines and are low voltage. As such, care should be taken to keep them well removed from high voltage lines.

- **Do not run high and low voltage lines together within the same conduit.**

Shielded cable **must** be used for communications lines.

Although it is not strictly necessary to run communications wires from TSM equipment in conduit, it is <u>desirable</u> from a safety and aesthetic point of view.

Moving plastic granules can produce extreme static charges - leading to malfunction.

- **Therefore do not attach communications cables to material conveying lines or other conduit containing cables with high voltages or high currents.**

If possible, the communications lines should be run in armoured trunking that is properly earthed/ grounded at <u>one</u> end only.

- **Flexible tubing with a <u>ground wire must be used</u> for all conveying lines.**

Keep all communication lines well removed from vacuum loader and/or material conveying pipes.

Cable shields must be properly connected at **one end** of the cable only.

Note:
Ensure that all TSM System cables are connected before switching power on. Do not connect or disconnect TSM system cables while power is ON
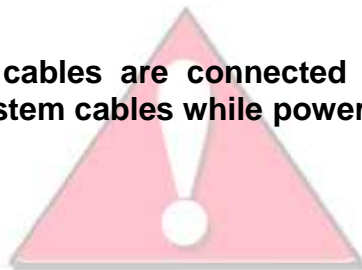
Initial Setup – Starting the Blender

The following sequence should be completed on initial power up of the blender.

Home screen

1. Power up
- Connect mains power lead. (Please read the safety information in the introduction section for warnings and the maintenance section page26-29 for the electrical connections)

- Check that the operator display is showing the home screen

- The TSM blender range are designed to allow easy operation for operators of all nationalities. The system operation therefor uses internationallly recognised symbols.See user manual for symbol descriptions

Touching the home icon allows the user to return to the home screen from any screen

System Menu

2. Weight hopper Calibration.
(Front door of the blender must be open to calibrate the load cell)

- Touch

- Touch

- Enter the supervisor password
(Factory default password is set to **5560**)

System menu

- Touch

- Touch

WARNING
Some the system parameters can be changed from the calibration menu, so it is advisable to restrict the number of personnel who have access to the password.
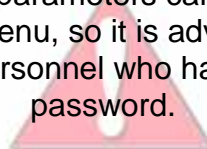
3. Tare the Hopper. (setting the zero point.)
Ensure that the mixing chamber door is open and there is nothing touching the weight hopper before attempting to tare the load cell.

With the weigh hopper empty, allow the weight reading to stabilize and then touch

This value now becomes the zero reference point for the load cell readings.

4. Check Weight Calibration.

Gently slide the weigh hopper out and place a known weight into it (use a weight close to the batch size)

Touch this icon and if for example if the calibration weight is 1kg, enter 1 on the numeric keypad. (The lower value on this icon is the actual weight)

Calibration weight

Actual Weight

- The Blender automatically re-calibrates itself and the actual weight should now be displayed correctly.

- Remove weight from hopper. '**Weight (Kg)**' should now return to zero.
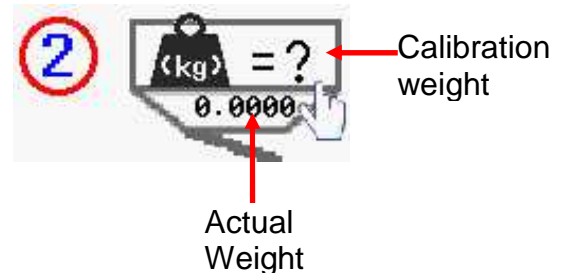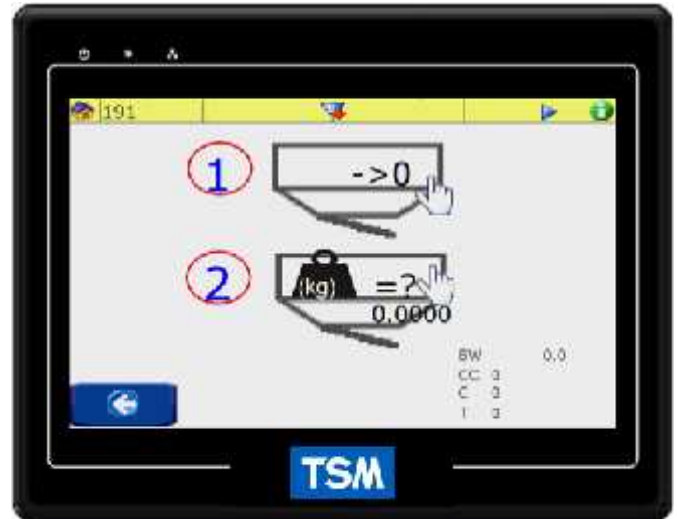
The ideal batch weight will be factory set. If it is necessary the batch weight can be changed inside the engineering section.

Blender Type	Recommended Batch size	Load cell Max weight
Optimix	0.7Kg/1.5lb	5kg
TSM350	2Kg/4.5lb	10 Kg
TSM650	3Kg/6.5lb	10 Kg
TSM1000	5Kg/11lb	20 Kg
TSM1600	7Kg/15lb	20Kg
TSM3000	25Kg/50lb	40 Kg

Upon sucessful completion , procede to enter the first recipe name and setpoints.

- Use ⬅ to exit to "**calibration Menu"** & save settings or 🏠 to go to the home screen

5. Entering Set points.

▪ Touch [%]

▪ Touch [✋]

▪ **Enter the operator password (default set to 1)**
'

Recipe entry modes

Auto

The recipe entry mode will be factory set so that component 1 does not need to be entered.
The required quantity of natural material is calculated by the blender.

Manual

If preferred the recipe entry mode can be set to manual. All of the component
percentages need to be entered and it is necessary for the operator to verify that
they total 100%. If they don't total 100% the recipe cannot be started and a
warning icon is displayed.

NOTE: Once a recipe is successfully entered it is automatically stored in
the recipe memory and allocated a number displayed in the recipe book.
The recipe name and the recipe number are also stored. (Up to 100
recipes can be stored)
Use the ◀▶ to move between recipes

Entering recipe name (alphanumeric)
Touch this icon and enter the recipe name
(Up to 10 characters)

To enter the setpoint percentages for the individial
components touch the corosponding percentage as
shown and the numeriaal keypad will appear.
(Remember component 1 is automaticly calculated)

Enter the percentage and then touch ✓

Regrind (optional)

If a regrind is added to the recipe there are 2 options.

Regrind can be treated as part of the 100% calculation (R+%=100%) or it can be added outside the 100% calculation (R+ %> 100%) (Factory default)

To add a regrind component _____ %_____ touch the blue tab

- Touching the recycle icon allows you to select the regrind hopper

To start a valid recipe that you have just entered

- After confirming the recipe number

When you RUN the recipe you have two options.

1. You can reset the order totals. $\Sigma \rightarrow 0$
   (reset the order report totals)

2. You can start the cleaning cycle (optional)

The options are enabled/disabled by touching ☑

Blender Alarms

Code	Alarm Icon	Description
16		Component fill alarm: The required amount of material did not fall through the slide gate. The component number will also be displayed.
48		Mixing Screw. The mixing screw output had tripped out due to over current.
112	kg ✓	In offline mode, the blender can be set to dispense a certain amount of material and this alarm is displayed when the blender is complete
160	% ≠ 100	Component Percentages are not adding up to 100%
170	% +/- ⚠	Deviation alarm The actual percentage of "x" component is not correct.
176		Level sensor alarm. The material in the mixer has fallen below the level sensor before the next batch was ready.
192		Hopper Leak alarm: The weight hopper flap failed to close completely.
208		Low Level alarm (optional) The material has fallen below the sensor in the reservoir hopper
224	⊽ ≠ 0	Tare alarm During the cycle, the system could not empty the hopper within 20 seconds.
300	⊽ ✗	The weigh hopper did not open. Check the hopper piston and the solenoid valve that supplies the piston
302	**None**	The load cell had reached its max value.
304	**None**	Minimum opening time exceeded. (A % that is too small for the component has been entered)

Code	Alarm Icon	Description
307	**None**	Fault with the AD part of the board. (The load cell will not function)
308	**None**	The load cell reading has gone negative.
309	**None**	A zero weight had been used to calibrate the weight hopper (load cell)
323	**None**	Ultrasonic sensor is not functioning correctly. (if fitted)
324	**None**	Bypass Valve opened alarm

Extrusion / Haul-off Control Alarms
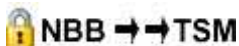
(See extrusion control section for full description and additional alarms)

Code	Alarm Icon	Description
32	m/min=0	The line speed has gone to zero. Check the displayed line speed.
64	**Control alarm**	The blender has not been able to control to the current set point.
128	SEI	SEI communications alarm The communications to the SEI card have stopped working
144	SEI	SEI Reset Something has caused the SEI card to reset.
240	Extruder Shutdown	Extruder shutdown by blender: If this option is enabled and the blender has not cycled for "X" minutes this option will stop the extruder.
316	**None**	Haul off SEI is not communicating. Check the connections to the SEI and ensure that the card address is set to 1.
317	**None**	Haul off SEI card has experienced a reset.
318	**None**	Haul off control alarm has been generated because the haul off could not be controlled within the haul off control band %.
319	**None**	Line communications alarm indicates that one or more of the controllers has stopped communicating.
320	**None**	The CP9000 has stopped communicating with the blender; check connections to the CP9000.
321	**None**	Haul off speed setpoint was not achieved when the system attempted to set the haul off speed.
322	**None**	The feedback from the extruder indicated that the system could not set the extruder to the required speed.

Vacuum System Alarms

Code	Alarm Icon	Description
313		Vacuum Receiver alarm The receiver number "X" failed to fill. (check vacuum recevier)

System Alarms

Code	Alarm Icon	Description
01	License➡➡TSM	Software License timeout. The software license timed out please contact TSM.
80		Calibration Alarm. The calibration data was restored from memory.
243	NBB➡➡TSM	Software security alarm. The NBB will need to be returned to TSM
301	SD	SD card Alarm: System cannot write to the SD card. The SD card needs to be re-formatted or replaced.
303	**None**	Problem reading the board memory
306	**None**	Invalid config: If there is a problem with the calibration data on power up
310	**None**	Problem with the board memory
311	**None**	Problem with the board memory
314	**None**	Ethernet alarm: (Reset the blender)
315	**None**	SD card Alarm: The File Allocation Table cannot be set up on the SD card. The SD card needs to be re-formatted or replaced.

Operator Touch screen Panel

The blender operator panel may be used to:

(A) View production data,
(B) Calibrate the blender,
(C) Enter material recipes,
(D) Download recipes from optional TSM ICS central control system,
(E) Print reports.

Home button.
Jumps back to this
screen from any
other screen.

Mode icon.
Shows if the
blender is
Stopped, Paused

Set and actual
percentage for
each component

Information icon.
Shows blender
information.

Go to screen option   **Alarm Icon**   **Menu Icons.**
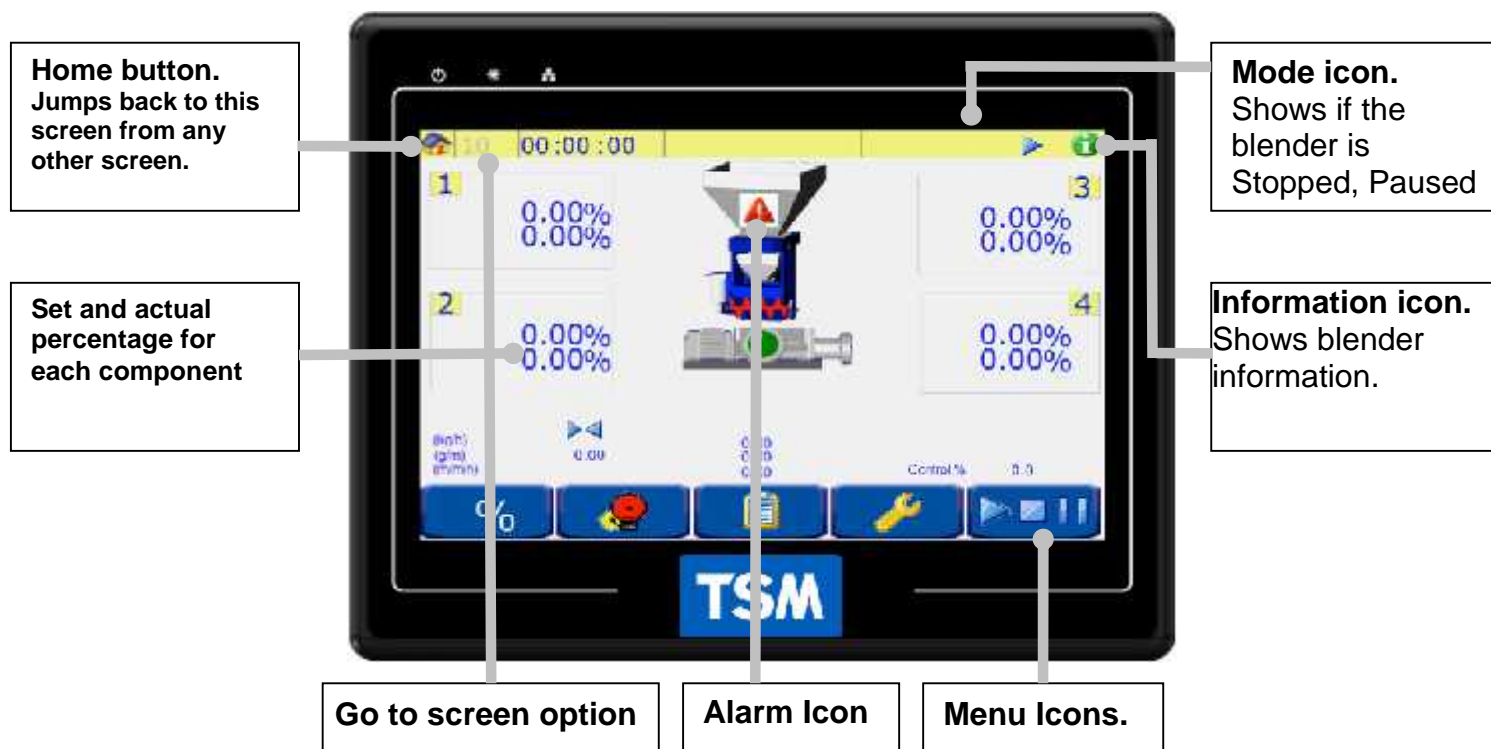
Home screen

The **"Touch Screen"** operator panel provides easy access to all parts of the SigmaBatch Blender menu structure.

Touch to enter recipe name, component percentages and job number.

Displays the cause of an alarm and the time at which it occurred.

Displays various reports generated by the system.

This menu contains all the necessary blender calibration and configuration options.

It is password protected so only authorised personnel can access any of the calibration sub-menus.

From this menu it is possible to start, pause or halt the blending process.

Password Setting

All TSM blenders include 3 levels of password protection:

Engineer Password (Default 9335). This allows access to the blender configuration area.
Supervisor password (Default 5560). This allows access to the calibration and diagnostics area.
Operator protection (Default 1). This allows the operator access to the recipe area.

Blender information icon 🛈

At the top right of the home screen you can see the blender information icon🛈. Touching this icon allows the user to see the critical blender information. Please take note of the information in this screen before contacting TSM with support issues.

This screen can be very useful when trouble shooting the blender, as well as the blender type, IP address and software version you can also see the last power up time and the number of batches the blender has made since the power up.

SD card

SD card is in position 📥

SD card is not in position 📥❌

Touching 📗 allows the SD card to be safely removed. (This will disable the SD card write function for 30 seconds)

	Warning:
	Never remove the SD card without disabling it first or the contents can get corrupted.

The icon allows you to see what options are enabled/disabled. (see setting the license section of this manual for further information)

In the right column you can see the board temperature and also if the blender is communicating to a network or any of the other TSM options that can be connected.

You can also see if some other external items are connected to the main board.

NET : Serial network port. I.E. cp9000
TCP: Ethernet port
SEI: Extrusion control card (SEI card)
LLS: Low Level Sensor card (for reading the bin sensors)
OPT: Optimization (special function)
V-1: Vacuum loading (integrated loading only)
WD: Watch Dog Timer. Used to prevent the software from freezing or crashing.

Blender Operation

Before operating, the blender should be configured and the calibration of the weigh hopper checked. (See the quick start guide in this manual for more details.)

- Check the correct materials are in the material bins.

- Verify that the mixing chamber door is closed, (please refer to the blender safety information in the introduction section page 3-5) and that the air supply is connected.

- Switch Power on the blender using the switch located on the side of the blender.
- Enter the blend recipe setpoints.
- Check that the blender is not paused.

See quick start guide on how to enter production setpoints.

Recipe Entry

Please see the quick start section for recipe entry information.

(Optional) Auto Cleaning Cycle

After a job is completed and before the next job changeover, the TSM blender offers an optional simple, easy to use the cleaning facility.

The blender may clean itself automatically on recipe change or after a manual request via the operator panel.

Mixer Cleaning upon Recipe Change

- Touch on the home page and continue to change existing recipe or 'Select' from memory by keying in job number.

- Touch '

- The cleaning cycle can be enabled ☑

- At the end of the cleaning cycle, blender display returns to Production Summary screen.

- For molding, the blender is paused and the operator presses "1" to continue the cleaning process 'Press Restart' to commence new recipe.

Using page numbers

Each page displayed on the operator panel has a unique page number for easy reference. The user may select a particular page number to go to that page. (the supervisor password is needed to use this function)

Touch the page number on the top left of the page as shown.

Touch this icon and enter the page number

Touch this icon and enter the supervisor password
.

Touch this icon to confirm.

Sample page numbers:	
Load cell caibration	191
Setting the Time	22
Software update	164
Communications diagnostics	37
Blender Self test	217

Alarms

If an alarm occurs, an icon will appear on the blender icon on the home screen and the red beacon mounted on the blender frame will provide a visual warning. Some alarms may cause the blender to enter manual mode.

To find the cause of an alarm touch the alarm icon on the home screen.

This page displays any alarm that has occurred (or cleared), the time at which it happened and it's current status. To remove alarms touch the **"X"** icon

Alarm Occurred

Alarm Cleared

Note: Alarm's clear every time the blender is powered off.

For the alarm description see page 5 of the quick start section.

For more detailed information on what each alarm message means, and how to troubleshoot the alarm see the TROUBLESHOOTING section of this manual.

> There is a position on the NBB board to connect an external alarm (see maintenance section for a diagram). This connection is a set of relay contacts and the external alarm should have an alternate power supply. Do not try power this alarm from the NBB board.

Reports

The **Reports** Menu allows you to view various reports generated by the blender. A sample of each report can be found on the following pages. To access any of these screens touch the reports icon on the home screen and then the appropriate icon for the page you wish to view.
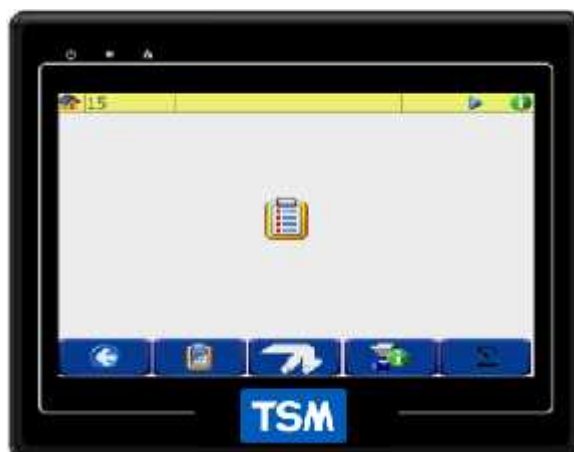
Current order

This report allows you to check the status of the current order. You can also reset the production order totals. Resetting order totals can be useful, (for example in the extrusion process) when you have to discard a start-up roll of scrap material that should not be included in the order total. Touch **"X"** to reset the order totals.

Order Report

The report shows all of the values for the previously completed order

In order to use the order reports correctly the order totals should be reset when starting a new recipe.

To reset the totals tick this box. $\Sigma \rightarrow 0$ ☑

Roll Report

If the roll change signals are connected to the SEI card this report shows all of the values for the previously completed roll including:

Start time

Finish time

Length

Component weight

Total roll weight Σ

Blender information

On this screen it is possible to view the set and actual batch weights along with the open/close status of the fill valve for each component configured.

Slide gate 1 open	1
Slide gate 1 Closed	1
Weight hopper open	
Weight hopper closed	
Mixing chamber full	
Mixing chamber empty	
Offline (optional) valve open	
Offline (material flow) valve closed	
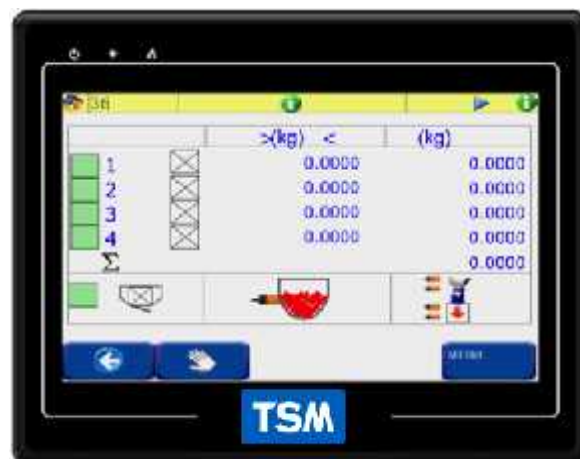
NOTE:

If the blender is paused the slide valves and weight hopper dump flap can be manually opened/closed by touching the ▭ icon. (The valve will stay open until manually closed)

Cycle	Inactive	
Blender Cleaning	Disabled	
Mixer Cleaning	Disabled	
Mixer Lever Sensor		Active
Material Flow Sensor		Active
Neck Sensor		Active
Flow Control		Active
Bypass Feed Valve		

Cleaning status(optional)

This screen allows the operator to view what parts of the cleaning cycle are active/inactive.

Totals

The Totals screen is used to display the:

1. Current total. This is a reset able total
2. Running throughout of the blender. This total is only reset if the blender is powered off. It is used to display the overall throughput of the blender.

Reset the current totals.

System menu

The system menu contains all the calibration options primarily used during initial setup and before normal operation. As all system parameters can be changed from this menu; a password is required for access from the Main Menu.

IMPORTANT: We recommend that you restrict access to the supervisor password to supervisor/management personnel and the Engineering password to technical personnel.
(The Password are shown on page 2 of this manual.)

From the System Menu, you can:

- Calibrate the weigh hopper.

- Set the time and date.

- Run the blender self test.

- Set and change the blender password

- Update the blender software

- Enable printing / saving to USB of all reports

- Enable the diagnostic logs/TELNET

- View communications between devices (Operator panel, SEI, network connection).
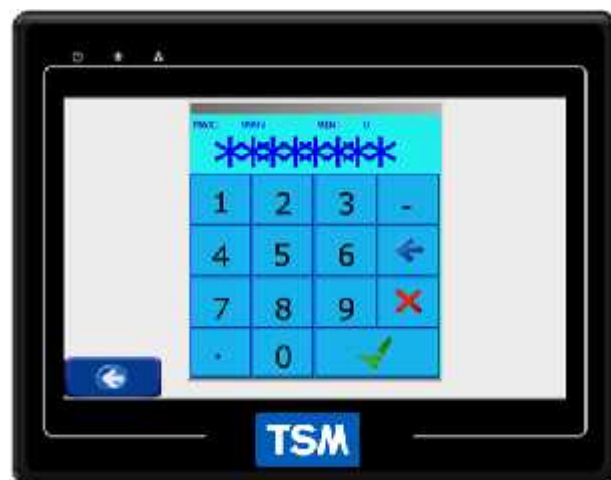
Load Cell Calibration

## Explained (see the quick start guide for how to calibrate the load cell.)

This option is used to ensure accurate weighing of material. As the procedure for calibrating the hopper is already dealt with in the *Quick Start Guide*, this section will only define the options contained.

.

. **Tare (zero)** -
(The blender front door must be open to tare the hopper).

Hopper Weight icon –
Displays the current weight in the weigh hopper. When calibrating the weight hopper the calibration weight can be entered here
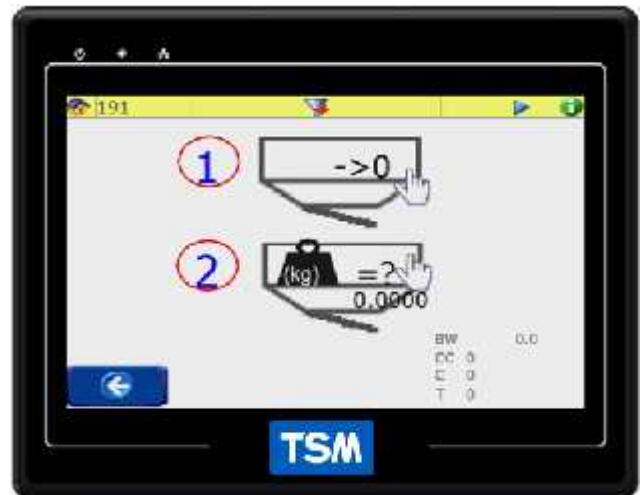
BW (Fill Target WT (kg)) – The batch weight can be seen here but cannot be changed. To change this it is necessary to use the engineer menu icon.
The two values shown on the bottom right of the screen are:

- CC : This value is the Calibration constant. The blender uses this constant to calculate the weight from the load cell A/D counts.
- **(A/D) Counts** – Analog to Digital readouts from the load cell.
-
- **A/D Tare Counts** –Zero reference point after the hopper has been tared.

(These values are useful when diagnosing the load cell.)

To access the diagnostics page from the System

menu touch   *.*

This menu allows you to:
Check the comms diagnostics.
Run the blender self test.
Select print options
Update blender software.
Backup blender configuration
Reload blender configuration

Blender communications

Good Transmit (Tx):
This indicates the number of messages transmitted.

Good Receive (Rx):
This indicates the number of messages received.

Checksum Error (C'Sum):
This indicates that the selected unit received the response but the checksum was incorrect when the complete message was received.

Timeout:
This indicates the number of times that the unit was transmitted to and received no response.

The counters are displayed for the Remote display, Network and the SEI
It is possible to reset the communications counters at any time by touching **"reset"**.
If you have more than 10% errors in the communications then there is something wrong with the comms.

RP- Remote operator panel.
SEI – This is the card used for extrusion control. (Optional)
LLS- This is the card used to read in the level sensors in the material bin. (Optional)
VAC81/2/3 - These cards are used to control the vacuum loaders when using integrated loading.
TCP/IP – This option monitors is the communications if the blender is on the factory network.

Printing/Saving report options to a USB drive

Use the ☑ to enable/disable the following options.

Icon	Explanation
	Enable print or save to USB stick
	History Report
hr	Hourly Report
	Shift Report
	Order Report
	Roll Report
	Event Report
	Batch Report
	Alarm Report

If there is a problem with the blender TSM may ask for one of these options to be enabled.

TXT
 This option can be used to log the

Alarms

Alarms and Batch Logging

When either if these options are enabled the blender will then start logging its Alarms/batch information to the SD card or USB drive. This information can be emailed to TSM to help diagnose a problem. (The batch logging should be turned off when not in use to lengthen the life of the SD card.)

Telnet: This remote diagnostic option allows TSM to remotely connect to the blender if the blender has a working network connection. Touch to enable.

Blender Self Test.
This option allows the blender to run a self diagnostic check.

Always running
Ad test runs automatically and there should

be a ✔ to show that the Load cell passed its stability test.

Manually running the Self Test.

WARNING: The Self Test will pause the blender for 25-30 seconds and therefore should only be used when the line is stopped.

1. Load cell: This switches a test voltage into the load cell input and verifies that the blender is reading it correctly.
2. A/D: Stability test is run for 10 seconds to verify that the load cell is not drifting.
3. Hopper Tare: tests the load cell's tare value is within range of its original value.
4. Component tare: Reads the load cell between each component filling to ensure there is no drift from the time a component stops filling and the next component starts filling.
5. Tare Dev: reads the load cell tare value after each batch and compares it to the previous batch. A change greater than 200 counts will fail.
6. Cal Const: Tests the load cell's Calibration constant is within range of its original value
7. Component Retry: Check the number of retries on each component in the previous hour. More than 10 retries will fail.
8. Std Dev's: Checks that each of the components are filling within range.
9. Memory: Writes and then reads back a block of text to memory.
10. SD Card: this writes some text to the SD card and reads it back.
11. Events: This will fail if any of the next 3 alarms fail.
12. Tare Alarms: Test fails if any tare alarms have occurred in the last 24 hours
13. Leak Alarms: Test is deemed to have failed if any leak alarms in the last 24 hours
14. Dump Flaps: Test fails if any weigh hopper dump flap alarms in the last 24 hours
15. Comm Panel:
16. Comm SEI: Communication is checked over a 2 second period, if there are any timeouts, then the test is deemed to have failed
17. Comm LLS: Communication is checked over a 2 second period, if there are any timeouts, then the test is deemed to have failed
18. Comm Op: Communication is checked over a 2 second period, if there are any timeouts, then the test is deemed to have failed
19. Comm Net: Communication is checked over a 2 second period, if there are any timeouts, then the test is deemed to have failed
20. Comm TCP/IP: Communication is checked over a 2 second period, if there are any timeouts, then the test is deemed to have failed.

 Settings.

Use this option to set the correct time, day and date.

Touch the appropriate box on the Line and enter the new value.

 Touch the save icon to update the time.

 Passwords.
This screen can be used to change the operator and supervisor passwords.

 Operator password
This allows the operator access into the recipe section.

 Supervisor password

This allows the supervisor into the recipe section and also the system settings .
This password should be restricted to authorised personnel as it allows access to the blander calibration settings.

See the quick start section of this manual for the factory set passwords.

NOTE: It is important to make a note of the new passwords.

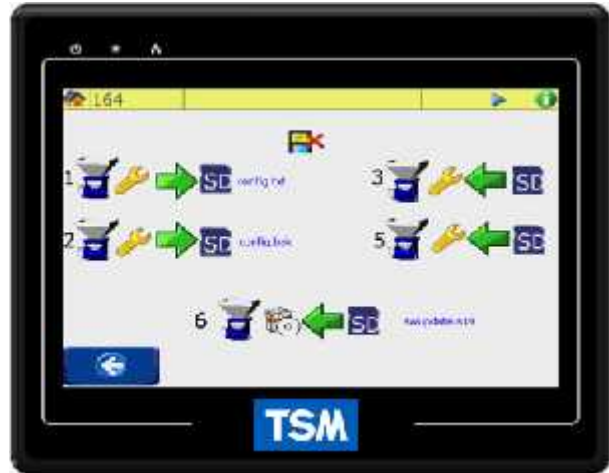Updating the blender firmware and backing up the blender configuration.

The SD card is in position

The SD card is missing

Configuration options.

1. Save the blender configuration to the SD card.

2. Save a backup of the configuration to the SD card

3. Load the configuration from the SD card

5. Load the backup from the SD card.

Updating blender software: (See software update section)

6. Load the new software version from the SD card.

WARNING: Before removing the SD card you must open the 🔵 screen and touch the 🔲

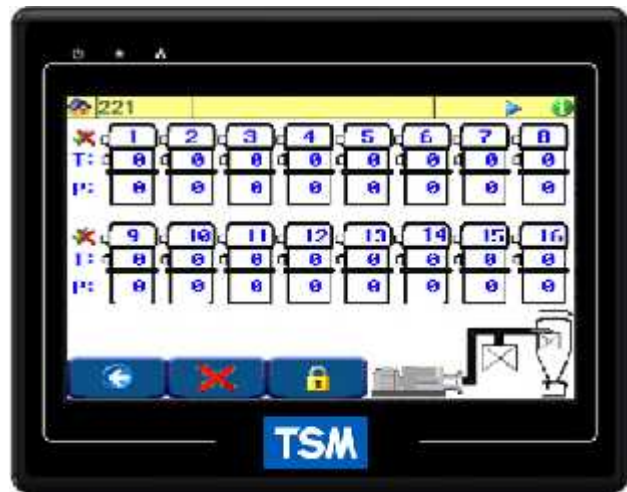🔺 Saving to the SD card is suspended so it is safe to remove the SD card

🔲 Do not remove the SD card the blender may be saving information to the SD card.

Integrated Loading.

Please see the integrated loading section of this manual if your blender has been configured to operate with integrated loading.

This section is used by TSM personnel and is protected by another password to stop unauthorised personnel from changing the blender settings. TSM should be consulted if any changes are needed in this section.
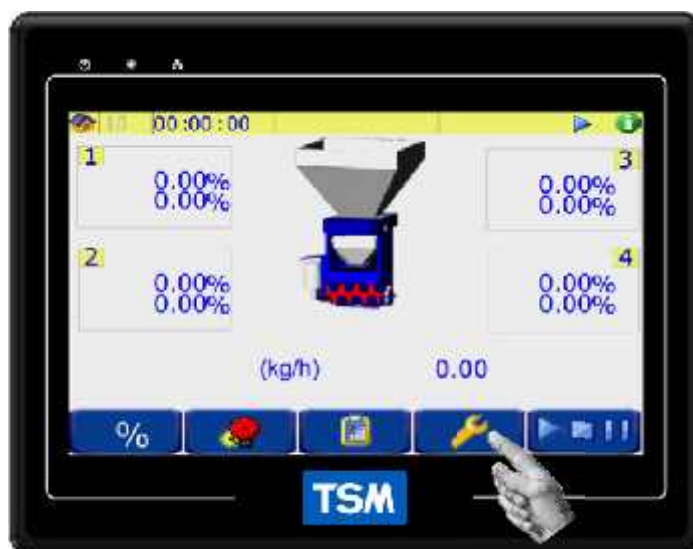

Caution: changes to any settings inside this area may stop the blender or cause it to function incorrectly.

Setting the Blender IP address.
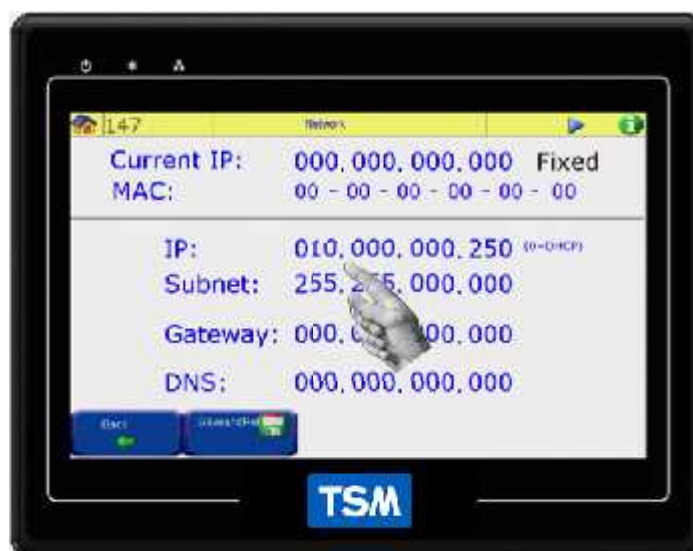
Touch the [wrench] icon.

Enter the password 9335

Touch the [Network] icon.

Then touch the [IP Addr] icon

Touch as shown to set the network settings.

Touch the "Save" icon when finished.

[▶ ■ ❚❚]

Mode

The four options in the **"Mode"** menu, they can be used to:

Stop the blender cycling immediately

Allow the blender to finish the current batch, drop it and then stop.

Restart the blender.

Manually start the cleaning option.

WARNING: The above options do not stop the mixing motor.

Setting a license

Some options are licensed and therefore can only be changed by getting a licensed code from TSM

Touch the ⓘ icon to open this screen.

Touch the 🖐 icon to open the license screen

You will need to call TSM to get a new license code but you will need to know the "Software ID" in order to get the new license code.

When you get a license code from TSM touch the **0** 🖐 icon to open the keypad. Enter the license code then touch the save icon to save the license. The option should then have a ✔ beside it to show that is enabled.

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To update the blender software you will have to copy the new software version onto the Blender SD card.
To do this:

1. Touch the 🛈 **(Fig1)**

> **Warning:**
> The SD card must be disabled before being removed.

FIG 1

2. The information screen will open (FIG 2) This icon will be shown if the SD card is in position (📀)

3. Touching 📇 allows the SD card to be safely removed. When the icon turns red (🔴), The SD card is safe to remove. The "safe mode" will time out after 30 seconds.
(It is not necessary to do this when putting the SD card back in.)

FIG 2

4. Move the SD card cover to one side then push the SD card and it will pop out.
5. Copy the unzipped swupdate.S19 and newsoft.s19 files onto the SD card.
6. Return the card to the NBB console.

Software Update

TSM

7. On the touch screen touch [icon] and enter the password (factory set to 5560).

Then [icon] and [icon] .to open the screen shown in FIG 3

To start the update touch

6 [icon] swupdate.s19

press software update

The screen will go blank for about a minute, see Fig 4.

No response from blender - Reset

FIG 4

Software Update

Press ![icon] icon and check that the software version has been updated
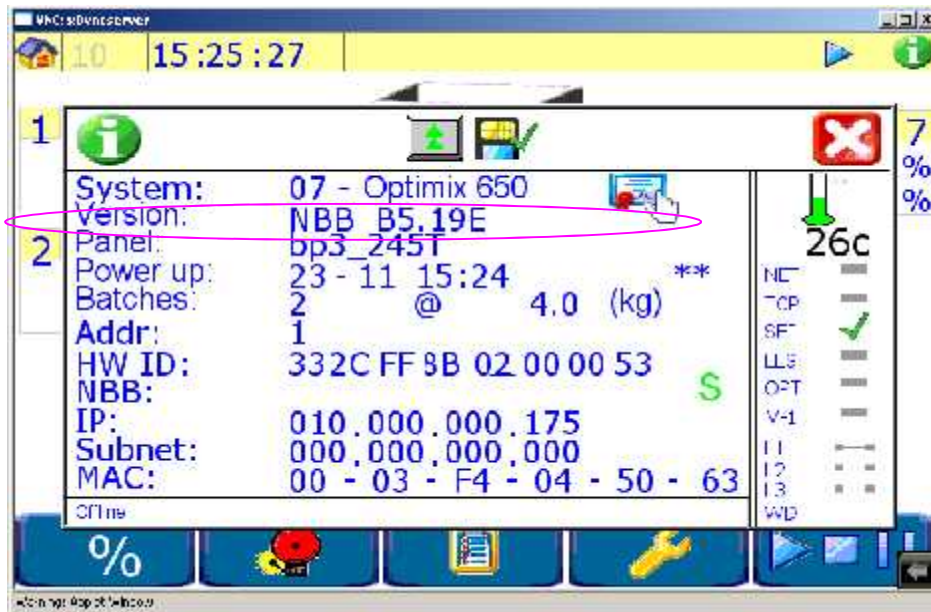
To remove the sd card from the blender do the following.
To do this:

1. Touch the 🛈 **(Fig1)**
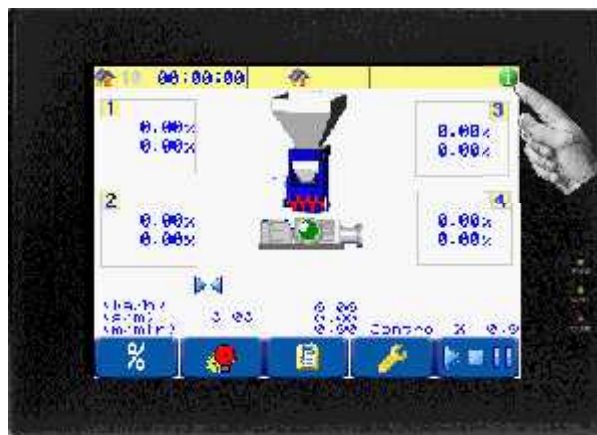
> **Warning:**
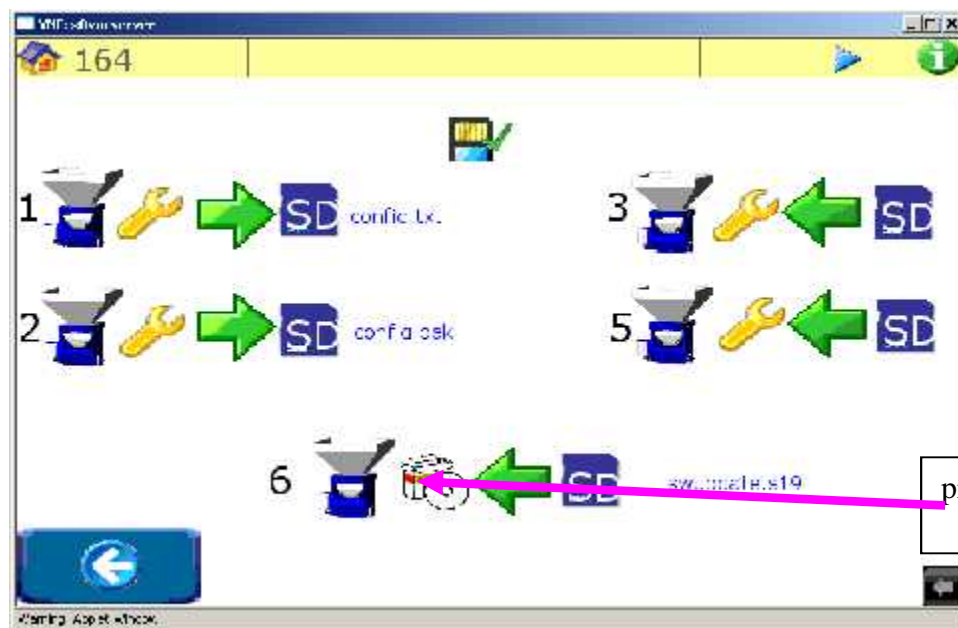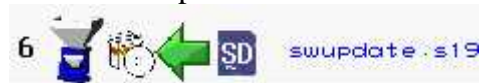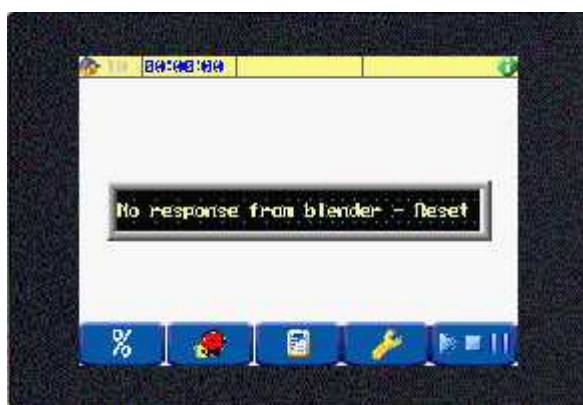> The SD card must be disabled before being removed.

FIG 1

2. The information screen will open (FIG 2)
   This icon will be shown if the SD card is in position ( )

3. Touching allows the SD card to be safely removed. When the icon turns red ( ), The SD card is safe to remove. The "safe mode" will time out after 30 seconds.
   (It is not necessary to do this when putting the SD card back in.)

FIG 2

4. Move the SD card cover to one side then push the SD card and it will pop out.
5. Now the SD card can be put into a card reader where the contents can be read
6. log files are labelled lgyymmdd where yy is the year, mm is the month and dd is the date.
   For example lg120210 is the log for 10th Feb 2012
   Evtn1202 is the event log for February 2012

_____ Maintenance

Foreword

You can avoid most problems by following the recommended installation, operation and maintenance procedures outlined in this User Guide. If you do have a problem, this section will help you determine what caused it and how to fix it.

Blender Cleaning.

When you change materials:

To prevent contamination of subsequent batches, you should clean all bins and chambers thoroughly. Drain the material bins, weigh hopper and mix chamber. Remove any residual material. The mixing auger can also be easily removed.
If you are using feeders to add material or colorant, you need to clean these feeders before filling them with different materials. Drain the feeder bin, remove the auger and using compressed air, clean out any residual material.

Weekly or as required:
Inspect:
A. Air regulator filters for condensation or other signs of water. Purge and clean the filter bowl if necessary.
B. Inspect the mix auger. Verify that the mix auger turns easily within the chamber. If the auger makes noise when rotating or does not turn easily, you may need to lubricate the ends of the auger with a commercial lubricant.
c. If the mix auger flights become sharp or damaged through wear, replace it.

Monthly:
A. Inspect power cables, wires and electrical connections.
B. Check for loose or exposed wires, burned contacts, and signs of damaged wires.
C. Check exterior power cords to the main power source.
D. Inspect air connections, hoses, lines for wear or damage.
E. Tighten connections or replace damaged parts

The load cell calibration should be checked at least 3-4 times per year. Failure to do this could result in production errors or losses. Please refer to the quick start section of this manual for how to calibrate the load cell.

WARNING: Pinch and auger hazards.

This equipment is equipped with pneumatic slide gates beneath the material bins and may have a pneumatic slide gate beneath the rotating augers in the side feeders and mixing chamber. Always disconnect and lock out the incoming power source before cleaning the blender or feeder. Always disconnect the compressed air source before working near the slide gates. Failure to do so could result in serious injury.

Blender Cleaning

All TSM blenders include an access door safety interlock which removes the Electrical power and discharges compressed air from the slide gates.

CAUTION: Flying objects. This blender is equipped with a compressed-air gun that can be used for cleaning the bins and mix chamber. To avoid potential injury, you must observe all safety regulations that apply to the use of compressed air for cleaning equipment.

Adjust air pressure to no more than **7.5 Bar (100 PSI)** for auger mixing systems. Wear protective goggles and clothing to prevent injury from flying particles and objects.

When you change materials, you should clean all interior surfaces of the blender thoroughly using a clean cloth, vacuum or compressed air.

Stop the blender, then disconnect the mains power lock out the main power source.

- Drain the material bins using Optional easy drain valves.

- Open the bin access doors and remove all material using compressed air or vacuum.

- Open the mixing chamber door and disconnect the weight hopper and remove same. Clean the weigh hopper.

- **For Optimix series blenders:**
  Remove the front plate of the mixing chamber and stainless steel mixing chamber liner.

- Empty residual material and clean the mixing chamber. You have the option of removing the mixing auger if necessary.

Maintenance

- Slide the weigh hopper back into the mix chamber, making sure that no obstructions prevent the hopper from resting evenly on the load cell bracket.

- Close the mixing chamber and material bin doors.

Troubleshooting

Forward.

Before you begin troubleshooting:

☐ Refer to the wiring diagrams and other schematics that were shipped with your equipment. The diagrams should note any custom features, such as special wiring or control options, not covered in this User Guide.

☐ Verify that you have all instructional materials related to the TSM SigmaBatch blender, its control systems and its components. Additional details about troubleshooting and repairing specific components are in these manuals

☐ Verify that you have manuals for equipment located upstream and downstream from the blender. Solving problems related to material conveyed to the blender or to extrusion quality may require troubleshooting equipment in the extrusion line.

Word of Caution

WARNING: This machine should be adjusted and serviced only by qualified technical personnel who are familiar with the construction and operation of this type of equipment.

DANGER: Voltage hazard. Always disconnect and lock out the main power supply before opening the blender electrical enclosure.

Troubleshooting procedures that require access to the electrical enclosure while power is on should be performed only by qualified electrical technicians who know how to use electrical testing equipment and understand the hazards involved.

Determining the Cause of a Problem
Blender alarms

Most problems will trigger one of the blender alarms.
The blender includes alarm checks for:

    A. Individual components
    B. Blender system alarms.

If an alarm occurs on the blender. ⚠ Will
appear on the blender bin and the red beacon
mounted on the blender frame will provide a
visual warning

If it is a component fill alarm, the blender will
continue to operate in automatic mode.

If the alarm applies to more than one
component the blender automatically enters
manual mode.

- To find the cause of an alarm, go
  to the production summary screen
  and touch 🌸 . The cause of the
  alarm and the time that it occurred
  will be displayed on the Alarm
  Summary screen.

- Touch ❌ to cancel an alarm.

For information on what each alarm icon means, refer to the
diagnostic tables on the following pages.

> **NOTE:**
> If you are using the blender with extrusion control please see
> the extrusion control section of the manual for all related
> alarms.

TSM

Batch Blender

When a problem affecting one of the material components occurs:

Component Alarms

♦ "ALARM" flashes beside the component number on the Production Summary screen.
♦ The blender continues to operate in automatic mode.
♦ The Alarm Summary screen displays an alarm message.

Alarm message	Possible cause	Solution
"Fill Problem on Blend x"	Is there material in the hopper above the slide gate?	Verify that there is material in the bin or feed hopper and that the loading system supplies sufficient material. (The material may have arrived after the alarm occurred.)
The blender was unable to fill the weigh hopper to the target weight from the component number displayed in the message	Does the recipe call for more material than the component valve or feeder can deliver? Refer to the percentage chart page 20 in the introduction section	Verify that the side feeder or material slide valve opening is the correct size for this application. Trying to put too much material through a feed valve that has a flow reducer insert can cause this alarm
	Has material "bridged" over the bin discharge, blocking material flow?	Verify that material is free to flow into the weigh hopper by opening the door of the blender, remove the weight hopper and manually open the slide gate.
	Did the air-actuated slide valve for this component fail to open?	☐ Verify that the RUN/STOP switch is in the RUN position. ☐ Verify that the valve is connected to compressed air supplying at least 6.0 bar (87 PSI). ☐ Verify that the solenoid and relay is working correctly. See "*Checking Fill Valves*" (**page 12**).
	Did the side feeder fail to operate?	☐ Ensure that feeder cable connections in the blender wiring cabinet are secure. ☐ Verify that the feeder solenoid light turns on.

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When a problem affecting the blender control or more than one component occurs:

System Alarms

◆ The blender automatically enters manual control mode after a period of time if the alarm is not resolved.

Alarm message	Possible cause	Solution
  "**Level Sensor Uncovered**" The level sensor in the mixing chamber failed to see material during a fill cycle	Was there a component fill alarm?	A component may not have filled correctly, causing the weigh hopper to delay dumping the next batch into the mix chamber. Verify that component bins and feeders have material, are operating correctly and that the loading system can maintain all components. This is an important alarm because it is possible that the extruder was starved of material.
	Is the level sensor faulty?	Check the level of material in the mixing chamber. If material is covering the level sensor even though it failed to detect material: ☐ Verify that the level sensor wire is securely connected to the correct terminal in the blender wiring cabinet. ☐ Verify that the level sensor sensitivity setting is correct. There is an adjustment pot on the sensor.
		Using this icon on the Reports/blender information screen you can check if the blender is reading the sensor correctly.

System Alarms

Continued…

Alarm message	Possible cause	Solution
"**Calibration Data Alarm**" The calibration data stored in the blender has become corrupted	Has a new version of the control software been installed recently?	Verify and re-enter calibration information as needed or the calibration data can be reloaded from the SD card. If the problem persists, contact TSM service technicians.
Mixing Screw	Something has stopped the mixing screw causing the current trip to trip.	The current trip needs to be reset after checking that there is nothing stopping the mixing screw from turning. It may be necessary to remove the screw.
% ≠ 100 Component Percentages are not adding up to 100%	The recipe has been entered wrong	Recheck the recipe This alarm should not occur if you are using the auto recipe entry setting.

Continued…

System Alarms

Alarm message	Possible cause	Solution
⊽ ≠ 0 "**Tare alarm**". During the cycle, the system could not empty the hopper within 20 seconds.	There is a problem on the load cell or the weight has not being tared to zero.	The calibration of the load cell should be checked. See "*Calibrating the Weigh Hopper*" in the quick start guide (**page 1**). Check that the dump flap below the weigh hopper is opening correctly and that is not touching the material in the mixing chamber.
"**Low Level alarm**" (optional). This alarm is only activated if low level sensors are fitted to the reservoir bin and connected into the system through the Input card	A component in the reservoir bin has fallen below the pre-set level.	Add more material to the reservoir bin as required.
% +/- ⚠ **Deviation alarm** The actual percentage of "x" component is not correct.	Non free flowing material can cause this or dosing the material through a valve that is not suitable.	Check the introduction section for the min and max percentages for each size of valve and verify that the set percentage is within spec. Check that there is no material blockage above the slide valve. It may be necessary to add a vibrator or paddle.
🔒 NBB ➡➡ TSM **Software security alarm**	The software cannot read the necessary information from the NBB	This cannot be resolved without returning the NBB to TSM
⚠ License ➡➡ TSM **Software License timeout.**	There may have been a temporary software license installed.	Contact TSM for a new License code

Load Cell Checks and Calibration

A malfunctioning load cell can lead to incorrect batch weights and persistent A/D Error alarms. The problem may be caused by material trapped around the load cell housing; a failure on the NBB control board, electrical noise; or a damaged load cell.

To check the load cell:

- **Power up the blender** using the mains power switch located on the side of the blender. **Open the front door of the blender as the load cell cannot be tared (zeroed) when the door is closed.**

- **Clean the weigh hopper and load cell area.** Open the mixing chamber door and slide the weigh hopper out. Using the supplied air gun, clean the hopper and any dust that may be around the load cell. Ensure that there are no granules trapped around the load cell and ensure that the weigh hopper is not being obstructed.

- **Check the mounting bolts for the load cell and bracket**. These bolts must be securely tightened. Two bolts mount the load cell to the block. Four bolts mount the block to the top plate of the blender chassis. Verify that the load cell cannot move from side to side on the mounting block. Also verify that the bolts securing the weigh hopper mounting bracket to the load cell are tight.
- If the slide valves have been fitted with guards check that there is adequate space between the guards and the load cell bracket.

- **Replace the weigh hopper** on the load cell.

- **Calibrate the Hopper.** See the quick start guide for information on how to do this.

- If the weight reading is not stable or you have to carry out the calibration more than once a month, contact TSM Support Services for further instructions.

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Checking Fill Valves

DANGER: Electrical shock hazard. Always disconnect and lock out the main power supply before opening the blender electrical enclosure. The solenoid valves are connected to the main voltage supply.

Procedures that require access to the electrical enclosure while power is on should be performed only by qualified electrical technicians who know how to use electrical testing equipment and understand the hazards involved.

There is one air-operated slide valve or Micradose valve associated with each compartment of the material bin.

Solenoids located on the back of the blender control the slide valves. Solenoid source drivers, located on the control module control the solenoid for each valve. Diagnose the problem by following the steps below.

1. Ensure the blender is not in stop/pause mode. This mode will be displayed on the top right corner of the home screen.

1. Touching the [icon] icon and then the [icon] icon will take you to the blender information page. On this page it is possible to see if the software is trying to open the slide valve.
If the software is switching on the output but the slide valve is not opening then the next place to check is on the control module.
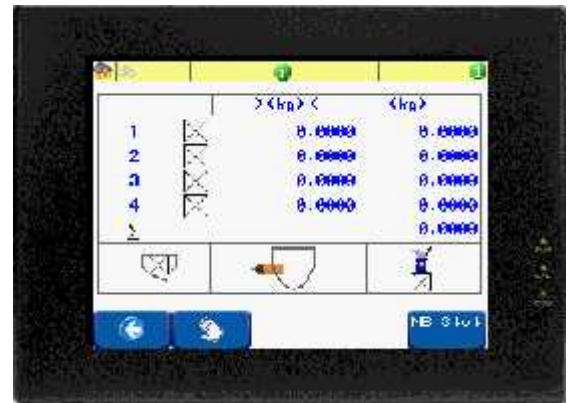
2. On the control module card there are LED's for each output. These are located directly above Conn 2 (valve connections) See page 25 for layout and led description

3. On the Festo valve block there are LED's for each valve. If the LED on the control module is activating and the led on the valve block is not then check the connections between the control module and the valve block.

4. There is a blue manual activation switch on the valve block pushing it up should activate the valve.(remember there may be material in the hopper so be careful opening activating the valve for long periods.)

5. Check there are no bends or kinks in air lines running between the valve block and the slide gate/Micradose valve.

6. Empty the material hopper. Open the front door of the blender and remove the hopper. Manually move the slide valve to ensure it can move freely.

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Checking side Feeders

⚠️	DANGER: Electrical shock hazard. Always disconnect and lock out the main power supply before opening the blender electrical enclosure. The solenoid valves are connected to the main voltage supply.

Procedures that require access to the electrical enclosure while power is on should be performed only by qualified electrical technicians who know how to use electrical testing equipment and understand the hazards involved. |

To check the feeders:

- Ensure the blender is not in stop/pause mode. This mode will be displayed on the top right corner of the home screen.
- Ensure the outlet from the material hopper is not obstructed.
- For the Micradose feeders check that quick release air pipe is connected.

- Use the same procedure outlined on the previous page to check the side feeders.

- Check that the light on the solenoid turns on as each feeder is activated. If the valve does not turn, ensure that the connector is securely fitted. (See page 25 for the LED identification.) If the connection is good, check the 24v is being outputted from the control module.
- There is a manual activation button on the valve push this to check that the valve operates manually.

- If there is still a problem, contact TSM Support Services.

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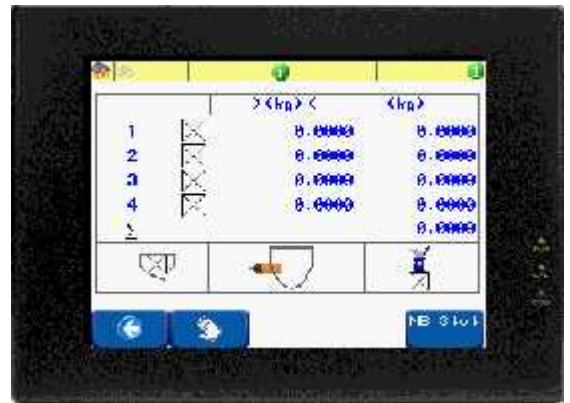
Calibrating the operator touch panel.

The touch panel should not need to be regularly calibrated but if there is a problem then it can be calibrated as follows:

To get the touch panel into Calibrate mode:
Power off the touch panel and remove the back cover.
Locate the dip switches and set them as shown below

Rear View

Dip switches

Dip Switch Settings

ON			
1	2	3	4
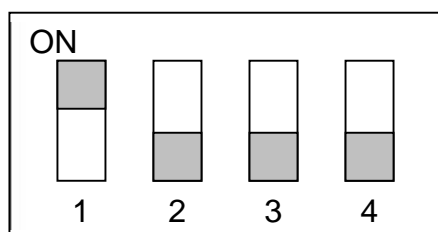
SW 1	SW 2	SW 3	SW 4	Mode
On	OFF	OFF	OFF	Calibration mode

In this mode when you power on the Touch panel, the screen will display a "+" sign at the center of the screen.
Use a stylus or finger to push the center of the "+" until it moves. The "+" moves to upper-left, upper-right, lower -left, lower-right and center. When all five "+" are done the "+" will disappear. The Touch Screen parameter is automatically stored.
Power off the panel and put the dip switches back as shown below.

SW 1	SW 2	SW 3	SW 4	Mode
OFF	OFF	OFF	OFF	Normal mode

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Wiring Considerations	
Blender is not powering up correctly.	*Please check quick start guide FAQ section. *
Communications errors. (Visible on diagnostics screen)	If communications to devices are showing more than 10% timeouts, (TSM diagnostic displays) check that the communication cables are not routed along side high voltage cables. Ensure that cable shields are terminated properly.
Do **NOT** run TSM cables with high voltage cables.	The wires connecting the various elements of a TSM system are normally communications/ data lines and are low voltage. As such, care should be taken to keep them well removed from high voltage lines. DO NOT RUN HIGH AND LOW VOLTAGE LINES TOGETHER WITHIN THE SAME CONDUIT. Shielded cable must be used for communications lines. Although it is not strictly necessary to run communications wires from TSM equipment in conduit, it is advisable from a safety and aesthetic point of view.
Why is it necessary to keep communications cables and material conveying lines separate?	Moving plastic granules can produce extreme static charges. If pipes carrying the granules are not properly earthed, then the electrical energy will be discharged down through the system electronics causing possible malfunction and damage. Generally, static symptoms include the resetting of the Remote Display or granules sticking to the sides of the hopper or the mixing chamber. Therefore do not attach communications cables to material conveying lines or other conduit containing cables with high voltages or high currents. If possible, run the communications lines in armoured trunking, which is properly earthed/ grounded at one end only. All conveying lines MUST BE made of flexible tubing and fitted with a ground wire.

Loadcell / Weighing Accuracy Issues

How do I clear a Tare alarm/ tare the blender hopper?	Tare the blender: (for more a more detailed explanation see the quick start section page 1,2) ▪ Ensure that mixing chamber door is open ▪ Touch the [wrench icon] button and enter the password. ▪ Select [icon] then the blender type ▪ Tare the hopper by touching [(1kg) = 0 icon] ▪ This now becomes the zero reference point for the loadcell readings.
How do I know if the blender load cell is calibrated correctly?	▪ Place a known weight, e.g. 1kg/ (2 lbs) , in the weigh hopper ▪ The weight will be displayed on the hopper calibration page. (see above on how to get to this page.)
If weight calibration is incorrect - what do I do?	Calibrate the load cell – (for more a more detailed explanation see the quick start section.) ▪ Tare the hopper as above ▪ Place a known weight, e.g. 1kg, in the weigh hopper ▪ Enter the value of the known weight. The blender automatically recalibrates and the actual weight should now be displayed correctly. ▪ Touch [icon] to exit to main page
If the Weight Measurement is not functioning properly, what should I do?	*Please check quick start guide FAQ section.*
I am having problems with the loadcell	*Please check quick start guide FAQ section.*

Other Accuracy issues

When feeding through the SLIDE VALVES My blender does not seem to be achieving the required accuracy	- When the TSM blender leaves the factory it is set to a standard slide valve configuration - unless specified otherwise by the customer. - The slide valve size determines the minimum and maximum percentages that can be metered for each individual component. See introduction section page 20 for standard slide valve size configurations. - If a lower % is required for any component, the appropriate insert must be attached. - See blender introduction section **page 20** for standard slide valve size configurations.
When using the MICRADOSE FEEDERS my blender does not seem to be achieving the required accuracy	- See the Micradose feeder % range specification tables in the SigmaBatch Quick-Start guide for the minimum and maximum % of batch weight, which can be fed for each component.

Operator Panel

The Operator Panel is not working - what should I do?	• Please Check Quick Start Guide FAQ Section* • Page 7

Other hardware

If the mixing motor is not rotating?	On the 3 phase models be sure that the current trip has not blown. It can be reset by pushing the reset button on the current trip located in the blender contactor box. *Please check quick start guide FAQ section.* PAGE 7

TSM

The mixing motor does not seem to be rotating in the correct direction - what should I do? (3 phase models only)	▪ **The mixing auger should rotate in a <u>clockwise direction,</u> when looking at the shaft of the motor from the motor end - conveying material to the center of the chamber**. If the direction of the mixing auger is incorrect: ▪ Switch mains power switch to "off" and lock it out. ▪ Disconnect mains power supply externally to blender ▪ Swap any 2 phases (e.g. L1 & L2) going to the blender ▪ Reconnect mains power and turn mains power switch to "On". ▪ Check that the rotation of the Mixing is correct. I.E. in a **<u>clockwise direction,</u> when looking at the shaft of the motor from the motor end - conveying material to the center of the chamber**.
If the Dump Flap/ Slide Gates are not operating?	▪ Check whether stop/pause icon is displayed on the top right of the home screen. ▪ Ensure that the door of the mixing chamber is properly closed. ▪ Check that the system is not in 'PAUSE' mode. ▪ Check status of the appropriate LED indicator on the NBB PCB. The LED should be on when valve is open. (page 25 for LED description) ▪ Ensure that the factory air supply is connected (TSM <u>recommend</u> air supply of 7.5 bar for optimum blender efficiency. An air supply pressure greater than 10-bar could damage the blender) The supply must be oil-free ▪ Check that air pressure on the pressure regulator gauge reads 7.5 Bar. This gauge is located at the side of blender control console.

Frequently Asked Questions

If the Micradose Feeder is not operating:	▪ Ensure 24v cable is securely connected in the correct socket of the NBB module in the control cabinet.
	▪ Ensure that the door of the mixing chamber is properly closed.
	▪ Check that the system is not in 'PAUSE' mode.
	▪ Check status of the appropriate LED indicator on the NBB. The LED should be on when motor is active.

Fill Valves

| I have problems with the fill valves | *Please check quick start guide FAQ section.* |
| If the slide valves are not operating? | *Please check quick start guide FAQ section.* |

Other issues

What version of software am I operating	▪ All of the blender information can be displayed by touching the 🌐 icon on the top right of the home screen. (see page 3 of the user manual for a more detailed description).
Accuracy Problems	▪ Sometimes a faulty load cell may affect accuracy, refer to page **2** in the Quick Start Guide to check the weight measurement. ▪ Running the blender automatic test routine may identify the source of the blender inaccuracies.
	▪ TSM blenders incorporate and advanced vibration filtering system, however If there is excessive vibration on the blender and it is affecting accuracy, the blender may need to be isolated from the extruder.

TSM

Extrusion Control problems

How can Extrusion Control improve my process?	- Extrusion Control works by monitoring the throughput of material and adjusting either the extruder or haul off speed to keep it constant. - This means that either the throughput or the weight per length and thus the gauge of the extruded product can be kept constant. - This leads to improved quality, reduced start-up time, and reduced material usage - because it allows the process to run at minimum tolerances.
My extruder control is not working, what should I check?	*Please check extrusion control Extrusion control section. page 11
I am having a problem with line speed. What should I do?	*Please check extrusion control extrusion control section.* page 12

Statement on TSM remote service capability of blender (NBB module).

Remote access:
Each TSM blender includes an integral Ethernet port which allows remote access by customer or other authorized personnel.
This service level allows the user to access all blender functions available via the operator panel, including supervisor and engineering fields. (Assuming that the user is an authorized password holder)
TSM can provide remote support including configuration and software updates using this Ethernet port across the internet without any firewall configuration changes required on the customer's network upon request by the customer.

Maintenance

TSM

Our service experts are available to help with any problem you might have installing and operating your equipment.

TSM Control Systems also offer a comprehensive on site installation, training and preventative maintenance programme. You can contact our Customer Service Department by any of the following methods.

Tel : **+ 353 42 93 35 560**
Fax : **+ 353 42 93 34 422**
Email: **support@tsm-control.com**

You can commission TSM Control Systems service personnel to provide on-site service by contacting the Customer Service Department.

Should you encounter a problem commissioning or operating the blender please complete the following checklist before contacting TSM Control Systems:

❏ Ensure you have all model numbers and serial numbers for your equipment.

 Service personnel will need this information to assist you.

❏ Check that power is supplied to the equipment (see page 18 in the introduction section)

❏ Check that all connectors and wires between the control console and related components have been installed correctly as per the wiring diagram in this manual..

❏ Please refer to the troubleshooting guide of this manual (Section page15), which may assist in solving the problems.

❏ Examine the instruction manual(s) carefully for associated equipment, especially controls. Each manual has its own troubleshooting guide to help you.

❏ Check that the equipment has been operated as described in this manual.

❏ Check that all connections comply completely with accompanying schematic drawings and ensure that all precautions listed are satisfied.

Additional manuals and prints for your TSM equipment may be ordered through the Customer Service or Parts Departments for a nominal fee.

TSM

NBB Console External Connections.

Blender Mains Power Switch

Single phase Mains connection indicator

1.6A@220v
4A @110vac
5TT 20mm Fuse
for mixing motor
(Single phase only)

Mains fuse 5Amp

Mains power input socket

Connection to Blender Motor (single phase only)

Ethernet cable port

SD Memory Card

Operator panel connection

Printer USB port

USB Memory Stick port

TSM
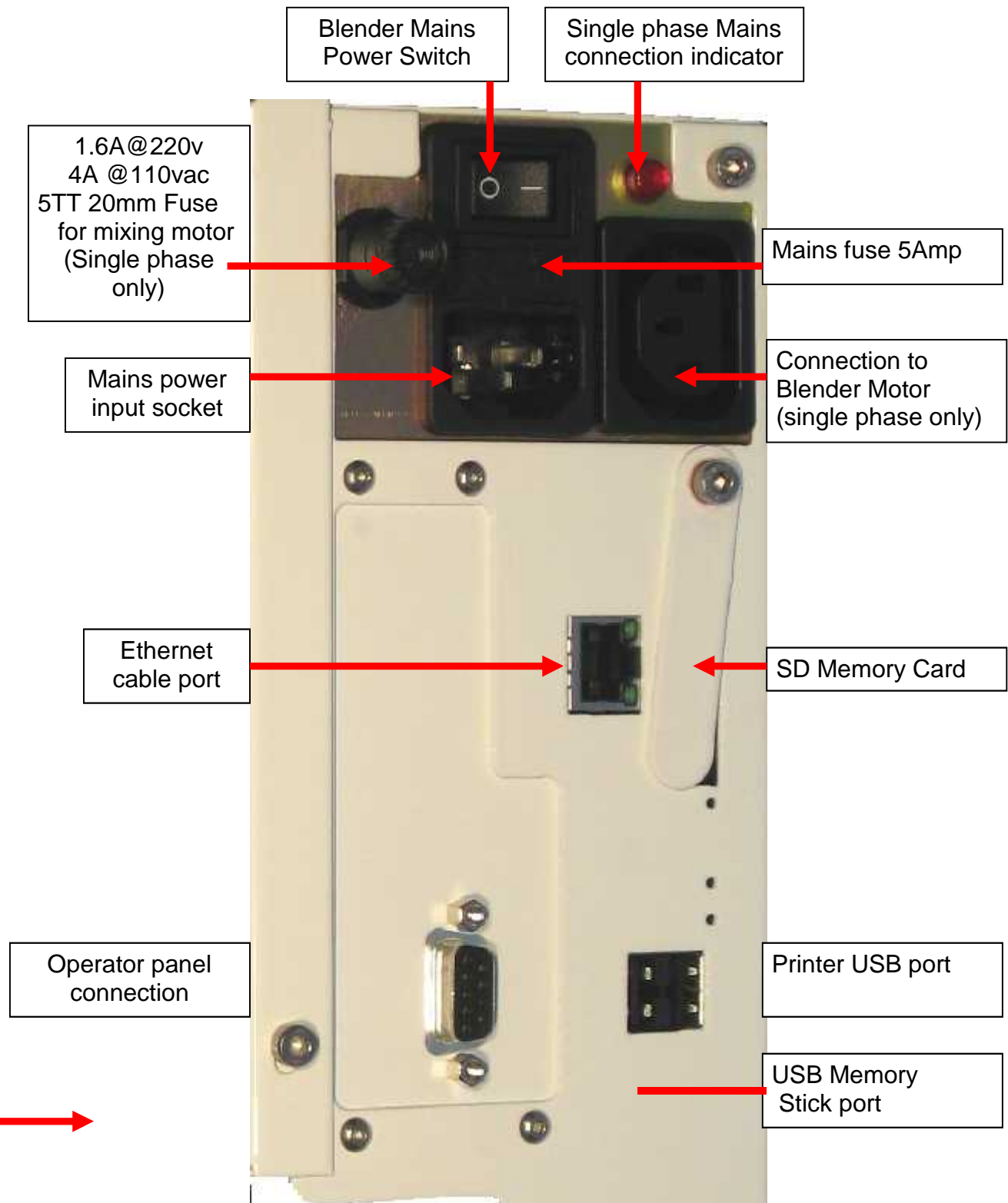
Removing the Blender control console

The TSM blender has been designed in such a way that all of the electronics parts are modularized. This allows them to be easily exchanged if a problem occurs.
The 3 main electronic parts are
1. The electronics control console. (control board and power supply)
2. The operator panel.
3. The Electrical Contactor box (3 phase blenders only)

If the blender develops a problem and it is necessary to change the control console, it can be done in four easy steps
1. **Switch all power off the blender.**

2. Open the tray on the bottom of the NBB console and disconnect all of the cables.

3. Open the thumb screw on top of the console

4. Lift off the console.

Then remove the SD card from the SD card slot (see previous page for location) and insert it into the new board.

Control console connections

Load cell connection A
(Load cell B is only used if a
second load cell is needed)

NBB Rev B6

CONN1A LOAD CELL

CONN1B LOAD CELL #2

CONN8 D-A BEACON

CONN9 MOTOR

CONN10 OFL/BYP

CONN11 DOOR

CONN12 CAN

CONN13 ALARM RELAY

CONN5 EXPANSION

CONN6 NET COMMs (RS422)

CONN7 DIAG. COMMs (RS232)

CONN14 SOURCE OUTPUTS

CONN2 VALVES

CONN3 TSM COMMs (RS422)

CONN4 LEVEL SENSOR

www.tsm-controls.com

LINK L3

SW2 ADDRESS

SW1 RESET

See wiring table
on next page

Modbus comms
address

Reset Button

LED 4	Slide valve 1
LED 5	Slide valve 2
LED 6	Slide valve 3
LED 7	Slide valve 4
LED 8	Alarm
LED 9	Clean
LED 10	Weight hopper
LED 11	Mixing Motor
LED 12	USB

Connecting a Side feeder or Dispensing aid.

The valve outputs are sent to the valve block via Conn 12. These outputs are duplicated on Conn 14. Conn14 can be used to connect a side feeder to a blender or to connect a dispensing aid (Vibrator or agitator).

For example to connect a Micradose side feeder as component 5 on a standard TSM 350.
You would connect it to pins 6 (GND) and 7 (24v output).

If an agitator is used on Component 1 then the agitator would be switched on using Conn 14 pins 1 and pin 6. This means that the agitator will only operate when the component is activated.

Conn14	Optimix 50 / 150 /250	Optimix 350/650	Optimix 350/650 clean	Optimix 1000/1500 / 3000
1	Comp 1	Comp 1	Comp 1	Comp 1
2	Comp 2	Comp 2	Comp 2	Comp 2
3	Comp 3	Comp 3	Comp 3	Comp 3
4	Comp 4	Comp 4	Comp 4	Comp 4
5	WH	WH	WH	WH
6	GND	GND	GND	GND
7	Comp 5	Comp 5	C	Comp 5
8	Comp 6	Comp 6	C	Comp 6
9	NA	NA	Comp 5	Comp 7
10	NA	NA	Comp 6	Comp 8
11	DMP	DMP	DMP	DMP
12	GND	GND	GND	GND

Micro dose feeder (optional)

WH = weight hopper
C=Cleaning
DMP = Air Dump

TSM

EUROPEAN 3 PHASE WIRING CONNECTIONS
(excluding Optimix 50 / 150 250)

3 phase box

BLU

BRN

BLK BLK BLK

A1
13NO
5L3
3L2
1L1

BLK BLK BLK

Isolator
switch

E N L

E

I

E

CONTACTOR
&
CURRENT TRIP

B

98 96
95

T1 T2 T3

3 PHASE SUPPLY
+ EARTH

CONN9

Single Phase
to NBB

3~
M

MIXING
MOTOR

3 PH+E
SUPPLY
380–410V
50/60 HZ

TRIP I/P
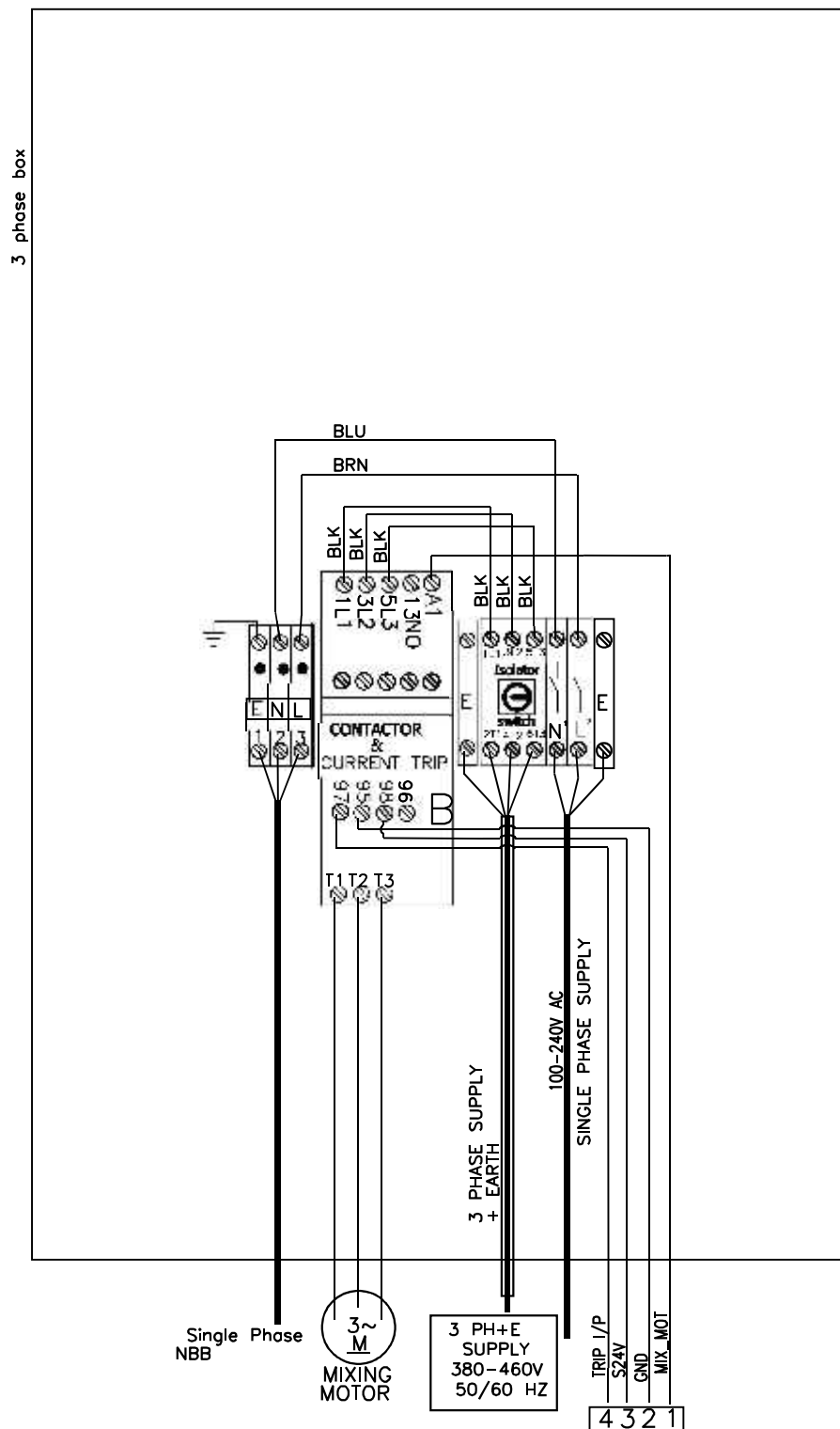S24V
GND
MIX_MOT

4 3 2 1

Note:

1 Neutral present in 3 phase supply

2 3 phase voltage maximum = 410VAC.

FILE = NBB - 3 Phase Box_ABB_A1.dwg (13/12/2012)

TSM

USA 3 PHASE WIRING CONNECTIONS
(excluding Optimix 50 / 150 /250)
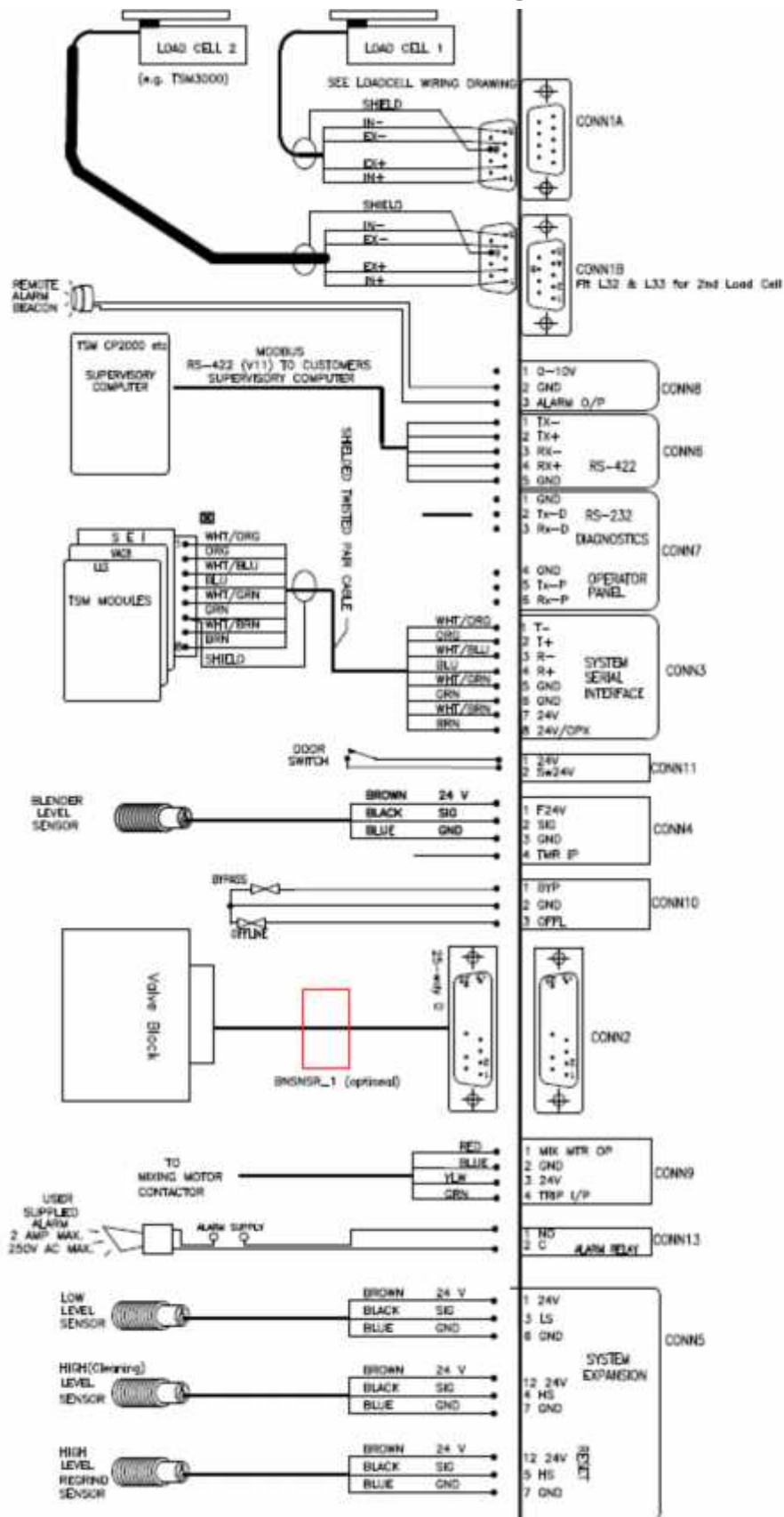

Note: Additional isolator switch contact X Y required if:

1. No Neutral present in 3-phase supply — need extra single phase supply.
2. 3 phase voltage greater than 410VAC — need extra single phase supply.

NBB OVERVIEW

NBB PSU Module

TSM

Name	Item	Qty
MIXING CHAMBER LINER	1	1
SCREW ASSEMBLY	2	1
MINI MOTOR	3	1
MOTOR COUPLING GUARD	4	1
HINGE DETAIL	5	1
PERSPEX DOOR	6	1
MIXING CHAMBER PIPE 2327	7	1
LEVEL SENSOR MOUNTING	8	1
M30 PROXIMITY SENSOR	9	1
TOP GUARD-185	10	1
BACK BEARING RETAINER	11	1
75mm SLIDE VALVE	12	2
SUB WEIGH HOPPER	13	1
HANGER 2 LHS-1365	14	1
HANGER 2 RHS-1366	15	1
EASY DRAIN TOP	16	1
DOOR INTERLOCK	17	1
LOAD CELL BRACKET 2	18	1
VENTURI SIDE FEEDER	19	1
DRAIN SLIDE ASSEMBLY	20	4
BIN ASSEMBLY U-3087	21	1
ASSEMBLY-2499	22	1
BIN TOP 1 3093	23	1
REAR MOUNTING PLATE	24	1
VALVE BLOCK	25	1
CONSOLE BRACKET 07	26	1
FILTER REGULATOR	27	1
07 CONSOLE ASSEMBLY	28	1
CONTACTOR BOX	29	1
LOAD CELL	30	1
LOAD CELL BLOCK 3305	31	1

TSM 350 — 650 EXPLODED

TSM
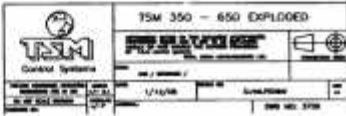
FIRST ANGLE PROJECTION
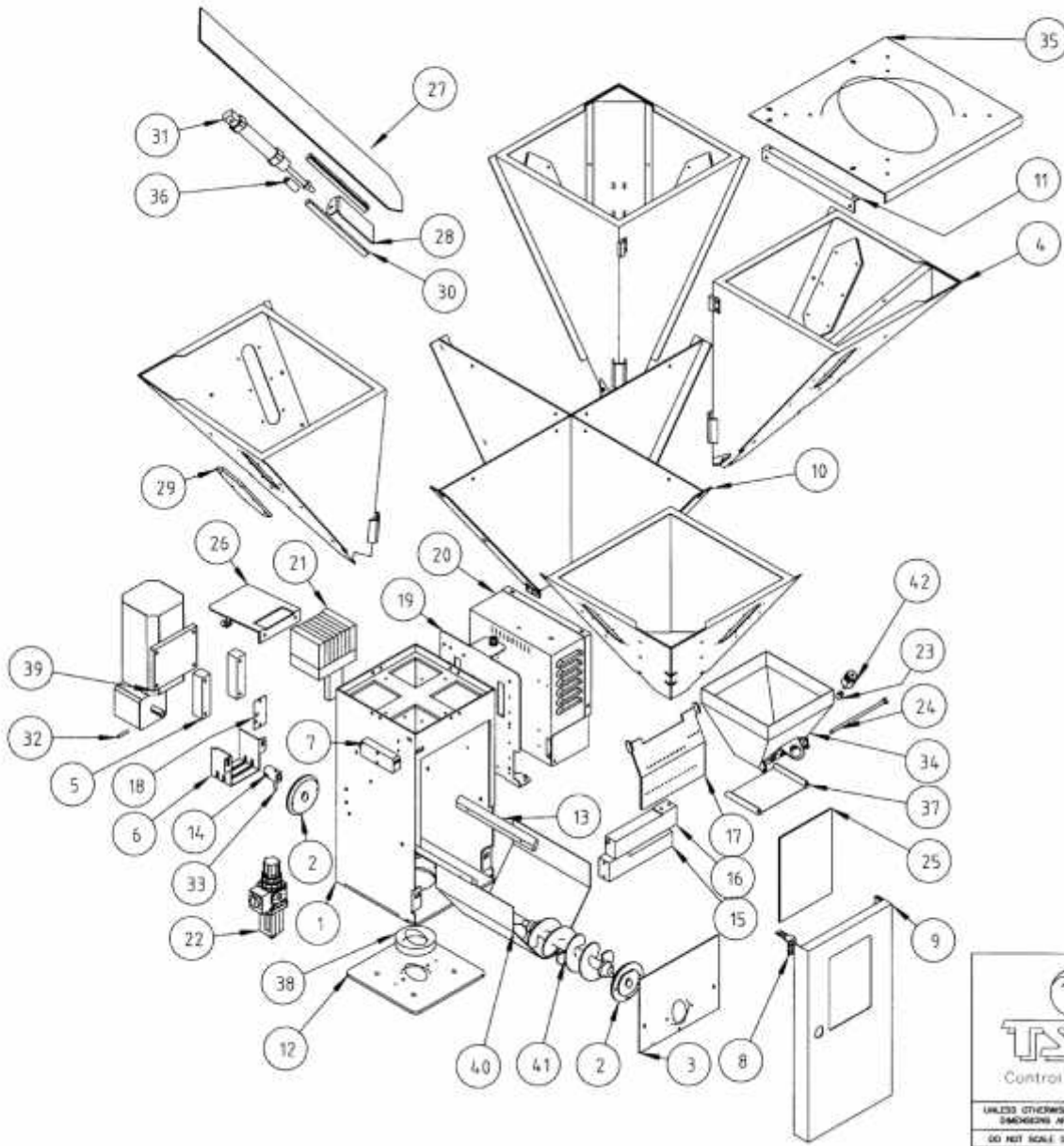
Name	Item	Qty
FRAME BODY-B 2660	1	1
SCREW BEARING-2067	2	2
MIXING CHAMBER FRONT	3	1
14 LITRE HOPPER ASSEMBLY	4	4
MOTOR SPACER	5	2
MOTOR GUARD-2142	6	1
DOOR SWITCH ST14 2963	7	1
DOOR SWITCH ST14 KEY 2963	8	1
DOOR ASSEMBLY	9	1
TOP BRACKET ASSEMBLY-2973	10	1
LOADER TOP BRACKET29756DWG	11	3
NECK ADAPTOR FLANGE-3141	12	1
MIXING CHAMBER RETAINER	13	2
SCREW COUPLING	14	1
LOADCELL BLOCK	15	1
LOAD CELL HBM SP4C3	16	1
LOAD CELL BRACKET 3161	17	1
LOADCELL GLAND PLATE 3166	18	1
CONSOLE BRACKET 07	19	1
07 CONSOLE ASSEMBLY	20	1
VALVE BLOCK	21	1
FILTER REGULATOR	22	1
ROD END	23	1
WEIGH HOPPER FLAP PIN-979	24	1
DOOR ACRYLIC	25	1
MOTOR COVER-3148	26	1
14 LITRE SLIDE BASE PLATE-	27	1
HOPPER SLIDE-2650	28	1
HOPPER CLEAR ACRYLIC3098	29	1
HOPPER SLIDE GUIDE 2613	30	2
HOPPER CYLINDER	31	1
MOTOR SPRING PIN 3756	32	1
COUPLING SPRING PIN 3757	33	1
WEIGH HOPPER ASSEMBLY -3754	34	1
LOADER TOP (STANDARD)3506	35	1
PISTON RESTRICTOR 3516	36	1
WEIGH HOPPER FLAP EXP	37	1
MIXING CHAMBER PIPE	38	1
MIXING MOTOR	39	1
MIXING CHAMBER B 2792	40	1
2 WAY MIXING SCREW-2701	41	1
WEIGH HOPPER CYLINDER	42	1
SLIDE BODY	43	1

OPTIMIX ISOMETRIC EXPLODED VIEW

TSM Control Systems

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PROJECTION USED

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MM	LINEAR +/- 0.1	DATE 21/11/08	DRAWN BY: D.HALPENNY	REV A7
DO NOT SCALE DRAWING	ANGULAR +/-1°			
CHECKED BY:		MATERIAL:		DWG NO: 3753

Maintenance

Material Low level sensor option.

NBB

(CONN3)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

BLK WHT YLW BLU GRE VIOLET BRN RED SHIELD

TO SEI CARD

BLK WHT YLW BLU GRE VIOLET BRN RED SHIELD

For Unused Connectors Fit Link Between Pins 1 &3

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

(CONN14)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

(CONN 10)

(VAC 8)   **Low Level Sensor Interface**

(CONN1)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

(CONN2)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

(CONN3)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

Link Settings
FOR L1-L8
FIT 2-3 & 4-5
FIT L9

BLACK (SIGNAL) BLUE (GND) BROWN (24V)

BLACK (SIGNAL) BLUE (GND) BROWN (24V)

Repeat For Sensors 4-8 As Needed

SENSOR 1

SENSOR 2

* Colors Relate To Sensors Normaly Used By TSM (i.e., IFM)

Extrusion Control

The extrusion control function is provided using the Serial Extruder Interface card (SEI).

The SEI provides the necessary interface to the drive for extruder control. This module is connected to the NBB electronics module Conn 3 via an eight-core shielded cable.

For weight per length control, it is necessary to connect a line speed encoder to the SEI card.

The SEI card provides the following functionality.

SEI card

The card is din rail mounted and its dimensions are 190mmX105mmx35mm

- Produces 0 – 10 volts to control the Extruder drive on connector Conn12.

- Line speed encoder is connected to Conn7 to allow the blender to measure the haul off line speed.

- Front/Back roll change contact inputs may be connected to connector Conn8 to allow Roll Reports to be generated.

- The TSM Remote Auto/Increase/Decrease module may be connected to Conn9 on the SEI.

- Relay to prevent extruder start if the voltage to the drive is not below a safe value.

NOTE:

The Start Up relay contacts on the SEI are only closed when the screw speed set point is <5%. The operator can therefore only start the extruder when the drive control voltage from the blender has been reduced below the 5% output level and thus this relay is

- Test line speed signal for diagnostic purposes.

Procedure for connection of SEI module

1. Mount the SEI module inside the extruder control cabinet. (it is desirable to have it mounted close to the drive so the 0-10v signal is not affected by noise)

2. Connect the SEI (Conn1) to conn3 of the NBB board in the blender electronics console using an 8 core shielded cable (Recommended: cat 5E multi-core).

3. Connect the 0v and the 0–10 volts output from the SEI card (Conn12) to the drive controlling the extruder screw.

4. Also connect a back-up potentiometer and changeover switch. This will allow the user to switch to manual control of the extruder using the potentiometer, in the event of problems of any kind.

5. A start-up relay (normally open contacts) is provided and should be wired in series with the extruder momentary ON switch. This prevents the extruder from being started when a large setpoint voltage is applied to the extruder drive. The relay contacts will close only when the output voltage is reduced below 5% using the manual decrease icons on the blender.

6. Connect Remote Increase/Decrease/Auto-Manual switches (to CONN 9) if required. There are also a 24v outputs on Conn 10 for each of these switches that can be used to turn on a led or bulb the maximum output for each output is 50mA (2 watts)

7. If a line speed wheel is provided (weight per length control option) it should be mounted close to the winder on a **film driven roller**. The mounting bracket should be positioned securely to ensure no movement as the roller rotates.

Line speed Wheel

8. Route the line speed wheel cable back to Conn7 of the SEI. **Ensure correct polarity of connection and avoid running cables close to power lines.**

9. Connect Line speed signal from the Line speed encoder and roll changes contacts (if required) to CONN 7 and CONN 8 respectively.

> WARNING: if connecting the line speed encoder to more than one SEI card only supply the 24v from **one SEI card**

Checking Operation of the SEI.

- Check that the wiring from the NBB electronics module to the SEI is correct.

- Ensure that the SEI powers up when the blender is switched on (the LED's on the SEI card will flash at regular intervals.)

- Check that the SEI is enabled in the blender software:

1. On the Production Summary screen touch the Icon

2. Enter the password. (factory default – 5560)

Touch the TSM icon and enter the Password (Factory default 9335)

3. Touch [Config] to open the config Menu.

4.

5. To move onto next page touch [Page 2]

6. Check that Remote Modules option is set to **"SEI"**

7. If it is not selected touch the disable option to scroll to the SEI option.

8. Exit the page using the back option to save.

Diagnostics

Check the Diagnostics page to see if the SEI is working correctly.

- From the Production Summary page touch

- When prompted, enter in the Password.

- Once in the **System** menu, touch

- Then touch and
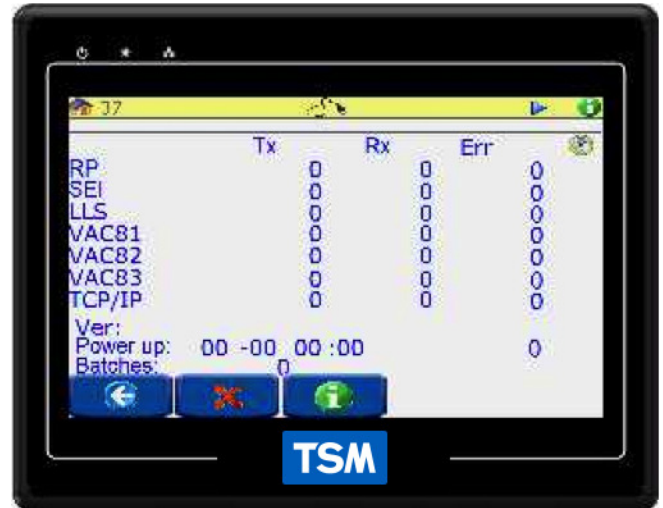
Good Transmit (Tx):
This indicates the number of messages that are transmitted.

Good Receive (Rx):
This indicates the number of messages received.

Checksum Error (C'Sum):
This indicates that the selected unit received the response but the checksum was incorrect when the complete message was received. I.E. the message could not be understood

Timeout:
This indicates the number of times that the unit was transmitted to without a response.

The counters are displayed for the Remote Display, low level sensor card, Network and the SEI.

Ideally the TX and the RX counts should be the same if you have more than 10% c'sum errors or timeouts then the communications are not working correctly. Reset the counters using the reset icon and allow them to count up to 100 counts as the errors may have accumulated over time.

If the SEI is not communicating, Double check the wiring and then contact TSM for further assistance.

To check that SEI is providing the correct voltage (0-10V) on CONN 12

- For a screw speed setpoint (voltage to Extruder Drive) of 10%, use a voltmeter to check that 1.0 volt is present between pins 1 and 2 of Conn12 of the SEI card.

    Example: If the screw speed setpoint is 25.4% the voltage should be 2.54 Volts.

To check that Lines peed and Increase/ Decrease (optional) are operating correctly

- Rotate line speed wheel and check that line speed is changing on the Production Summary page (m/min). This indicates that the line speed is being received.

- If remote increase/decrease switches are connected to SEI card, check that this operates in the same way as the Increase/Decrease keys on the Remote Operator Panel

To enter weight / length set point

- On the Production Summary screen touch [%]

- Enter the operator password (default 1)

- Enter the component percentages as per the instructions in the quick start section.

- [icon] Touch the extruder tab and enter in the appropriate Weight/Length set point.

Calculating Weight/ Length Set points
(Extrusion Control Mode Only)

In weight per length mode, the user may enter the set point in grams (or lbs) per meter (or per foot). To calculate the g/m:

g/m = thickness (microns) x 2 x width (Meters) x density

- density = average density of all components

- Ensure that the blender is in the appropriate extrusion control mode by following these steps:

Configuring Blender for G/m Extrusion Control (this is a licensed option and will need a license code form TSM to be activated.)

If the blender is not configured to operate in G/M mode.

A. On the Production Summary screen touch

B. Enter password (default 5560).

C. Touch the TSM icon and enter the Password (Factory default 9335)

D. Touch [Config] to open the config Menu

F. If the correct mode of operation is already selected touch **"Back"**. If it is not, Touch the option until the g/m option is displayed. Touch **"Back"** to exit and save your settings.

Starting the Extruder

- Before starting the extruder ensure that the Control Output is set to 0.0%. To get to the extrusion control screen touch   .
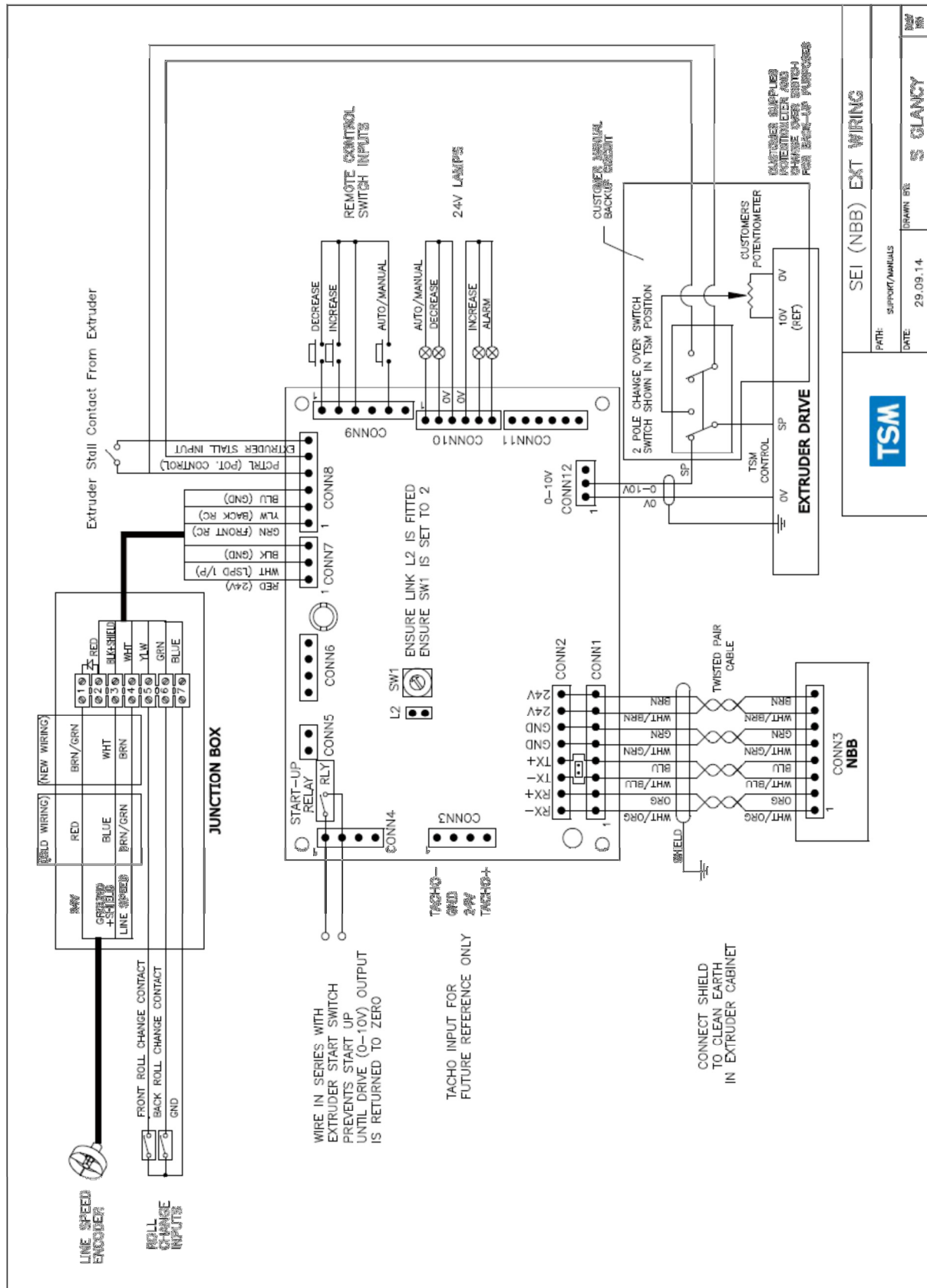
- If the set point is not set to 0% touch the   arrow on the screen.

Starting the Extruder Drive.

- Increase the screw speed gradually by touching the   key on the touch screen until the actual g/m is almost the same as the g/m set point (▶◀)(+/- 3-5 g/m)

- Allow the blender to complete 4 cycles (This is only necessary if the blender has not cycled since it was powered up).

- Check that the actual weight per length is registering on the production summary screen and it is within +/- 3-5g/m

- Now switch the blender to Auto by touching **MAN** on the operator panel.

- The extruder speed now will be controlled automatically to set and maintain the w/m or kg/h set point.

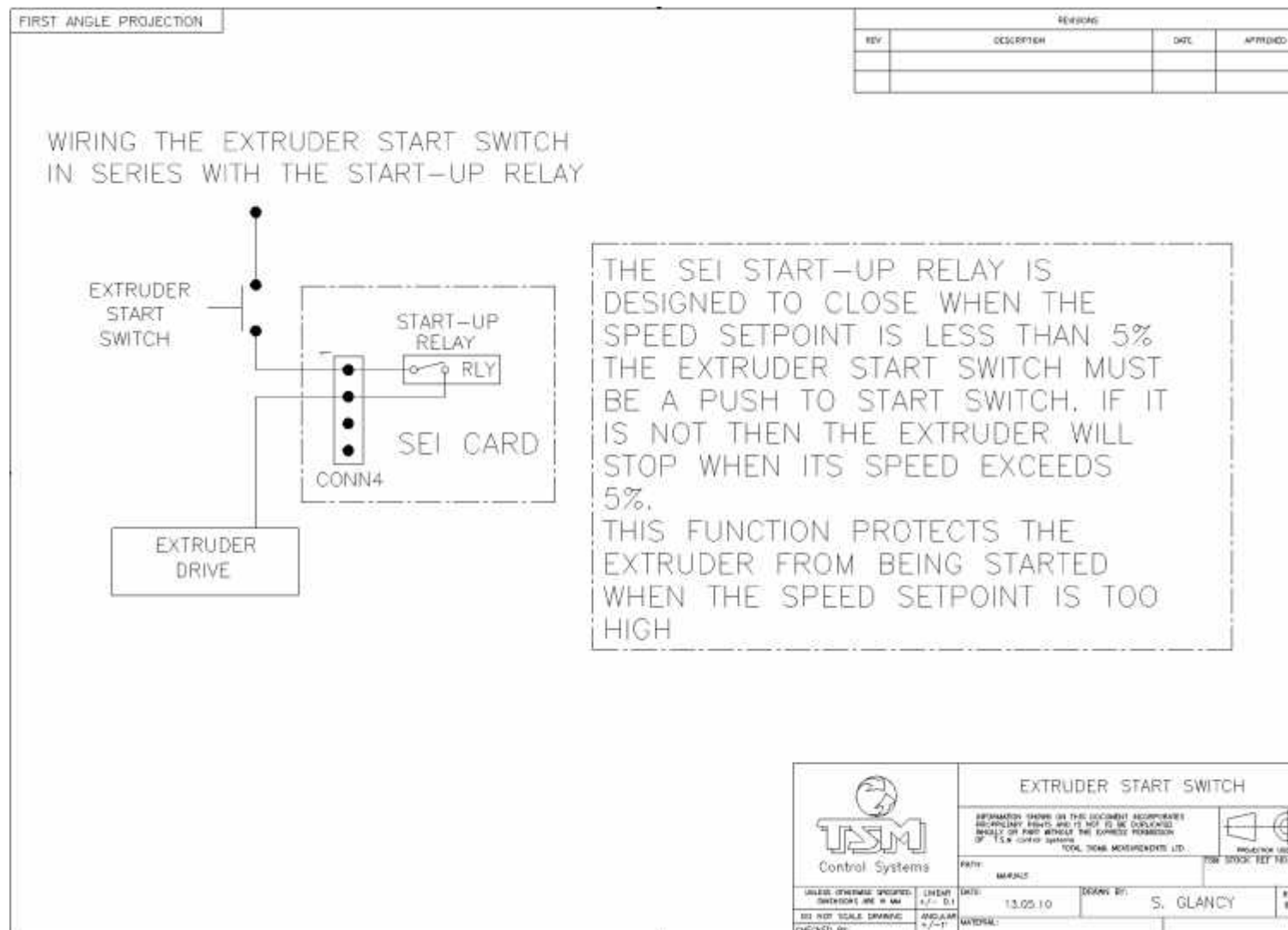- The red man icon will change to Auto and turn green.
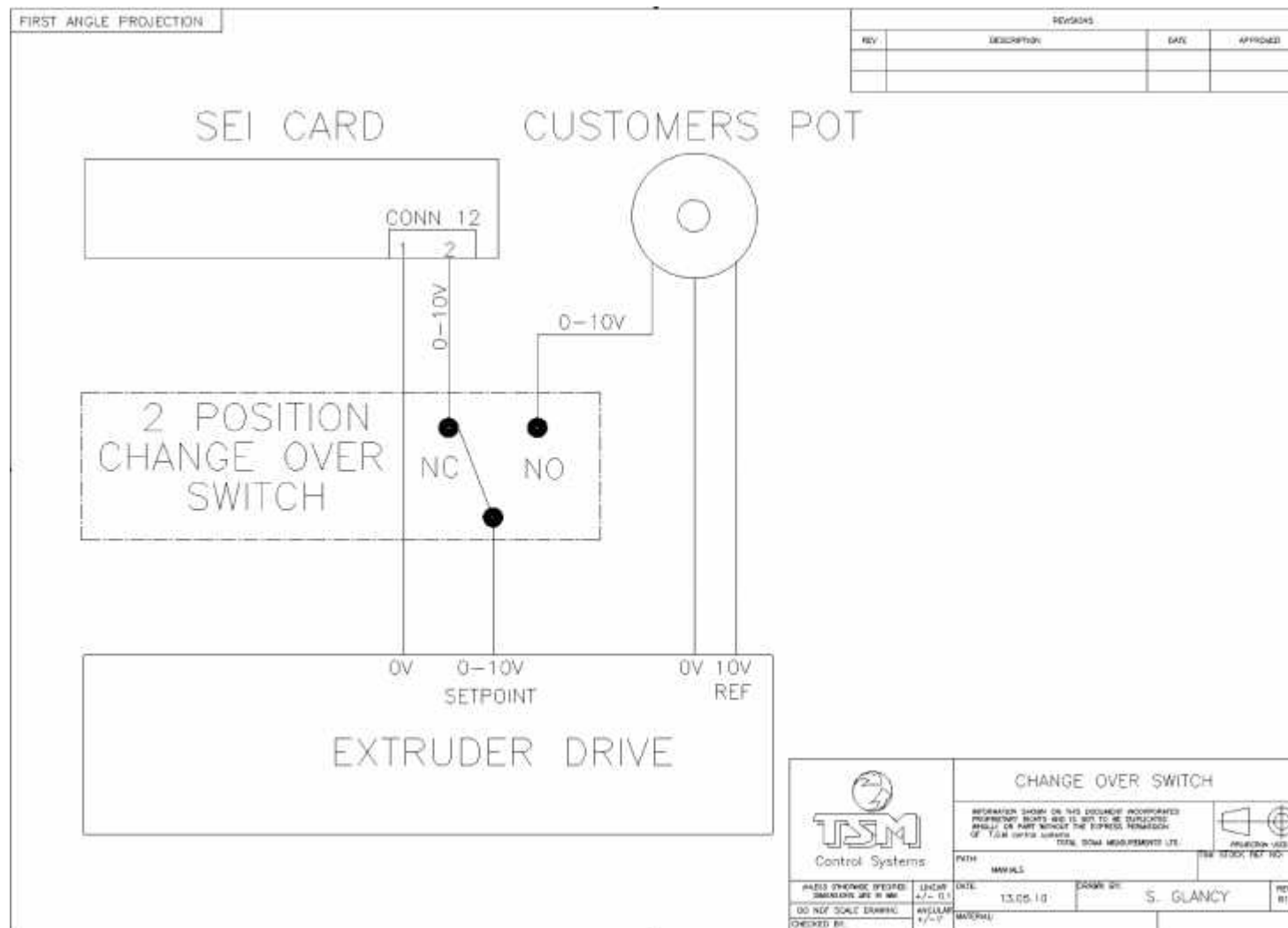
Serial Extruder Interface (SEI) Overlay Diagram

Extruder Start Switch

FIRST ANGLE PROJECTION

WIRING THE EXTRUDER START SWITCH
IN SERIES WITH THE START-UP RELAY

EXTRUDER START SWITCH

START-UP RELAY

RLY

SEI CARD

CONN4

EXTRUDER DRIVE

THE SEI START-UP RELAY IS DESIGNED TO CLOSE WHEN THE SPEED SETPOINT IS LESS THAN 5% THE EXTRUDER START SWITCH MUST BE A PUSH TO START SWITCH, IF IT IS NOT THEN THE EXTRUDER WILL STOP WHEN ITS SPEED EXCEEDS 5%.
THIS FUNCTION PROTECTS THE EXTRUDER FROM BEING STARTED WHEN THE SPEED SETPOINT IS TOO HIGH

EXTRUDER START SWITCH

TSM Control Systems

DRAWN BY: S. GLANCY

DATE: 13.05.10

Change over Switch (for backup only)

1.

CO—EX EXTRUSION CONTROL CONNECTIONS
EXAMPLE SHOWN FOR A 3 LAYER CO—EX LINE

LINE SPEED SIGNAL CONNECTED TO EACH SEI MODULE
ONLY CONNECT 24VDC FROM ONE SEI CARD AS SHOWN

EXTRUDER A

EXTRUDER B

EXTRUDER C

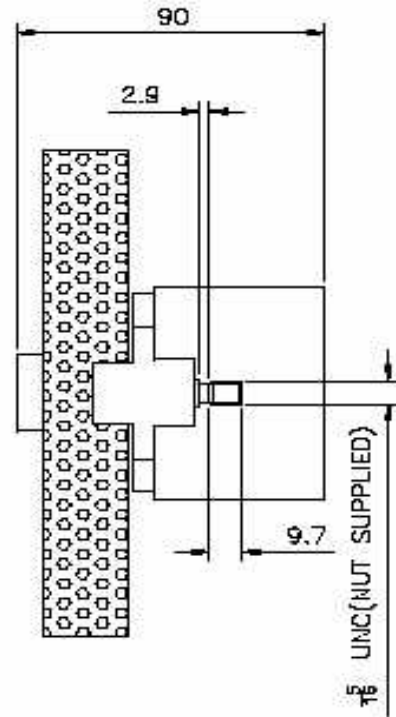# Mounting the line speed encoder

There are 2 main haul off types.

1. Horizontal oscillating haul-off: This is the most common type. When this type is used we recommend that the line speed encoder be mounted on a film driven roller (so it measures the actual speed of the film) close to the winder. The reason for this is that it is possible that the film can shrink or stretch as it cools

2. Vertical haul-off: When using this type of process it is necessary to mount the line speed encoder close to or on the nip roll. The reason for this is that the vertical haul-off causes the winder speed to vary depending on the direction of rotation.
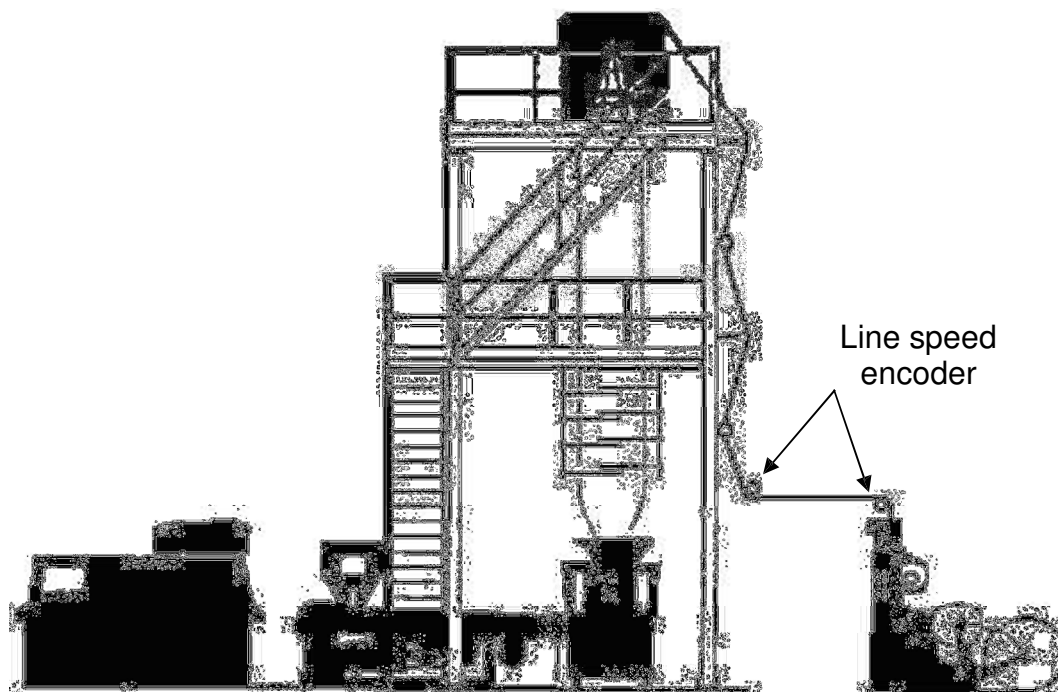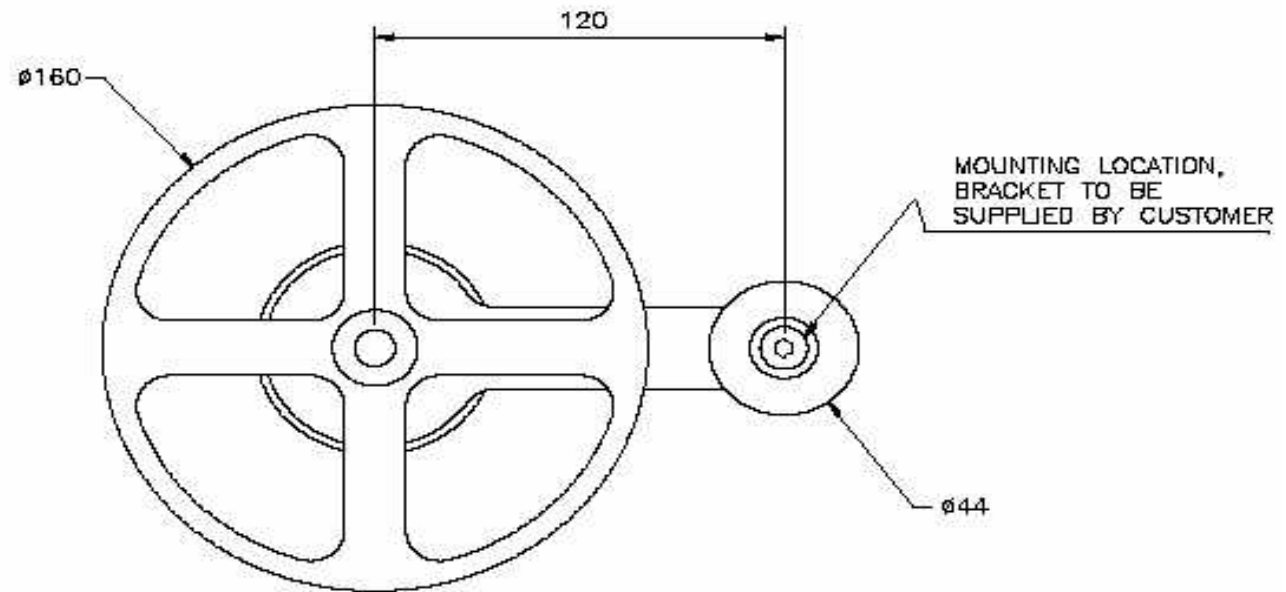

Line speed encoder

The above diagram shows two suggested position for the line speed encoder. Either of these rollers is ideal as the film is being pulled around the roller so it should not slip on this roller

The reasons why this position is better than on the tower:

1. This is more likely to be the final speed of the film taking into account stretching or shrinking.

2. The line speed encoder cable also contains 3 extra cores for the roll change signals and the signals are available at the winder.

3. The reason why we have pointed these rollers out as the ideal position is that the film is turning through 90 degrees on these rollers so there is good contact between the film and the roller. These rollers are film driven and therefore are moving at the film speed. A motor driven roller could have some slippage.

4. The encoder is in better position for trouble shooting.

90

2.9

9.7
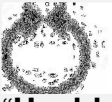
ø160

120

MOUNTING LOCATION,
BRACKET TO BE
SUPPLIED BY CUSTOMER

ø44

5/16 UNC(NUT SUPPLIED)

END ELEVATION

ELEVATION

Common Start-up Issues (Extrusion Control)

SEI is not working	▪ Check that it is wired correctly. (see previous page for the SEI overview and the Maintenance section for the wiring diagrams) ▪ Ensure that 24 volts are present on the SEI. ▪ Verify that the 24V LED is on and the Run LED is flashing (*see SEI overlay diagram on previous page) The* LED will flash at a regular rate if the card is functional. Check that the Tx/Rx LED is flashing. If not, check that the communications cable to the blender has been wired correctly. Is the SEI card enabled in the configuration section of the blender (page 2)
line speed is not working	▪ Ensure that the line speed wheel is wired correctly. ▪ Check that there is 24V between red and blue wires. ▪ If you are using a TSM line speed wheel, ensure that the lines peed constant is set to 2000 in the "**Line and screw speed calibration**" menu screen (*Shown in main user manual)* ▪ Make sure that the line speed wheel is in contact with a film driven roller, and is able to rotate freely. Ensure the line speed cable is not running close to high voltage power lines.

EXTRUSION RELATED ALARMS.

SEI ⏻ SEI Reset Something has caused the SEI card to reset.	Check that the shield on the comms cable is connected and that the comms cable is not running beside any high voltage cable.	It may be necessary to reroute the comms cable to move it away from high voltage cables. If you are getting more than 10% error on the comms counters then there is a problem.
➡➡**SEI** SEI comms alarm A loose connection between the SEI card and the NBB card.	Loose connection on the comms cable.	Check that all of the connections are ok between the NBB and the SEI card. Verify that the run LED on the SEI card is flashing and the 24v led is on. The comms counters can be seen on the diagnostics screen
"Unable to Control Blend" The blender was unable to control the throughput to the required set point, or it was unable to stay within the control dead-band.	Is the throughput too high for the blender or extruder screw? Is there excessive vibration?	☑Verify that the correct target set points for components and throughput have been entered ☑Verify that the blender and feeders are correctly sized to satisfy the throughput for this application. ☑Verify that the extruder can satisfy the throughput for this application. Excessive vibration can also cause control alarms. ☑Call TSM Control Systems if you suspect vibration is the problem
	Is the line speed stable	Verify that the blender is reading the correct line speed from the line speed encoder and that the speed is stable. The blender can cope with small changes in line speed but a large change will result in this alarm. Is the cable shield ok? Is the encoder making good contact with the roller?
m/min=0 Zero Line Speed	The line speed encoder is not rotating or there is a loose connection at the encoder or at the SEI card	Check that the line speed encoder can move freely and that all of the connections are ok.