Essae®
...for Excellence

DS-450/451 Series

DS-450SS

DS-450

DS-451 Flame Proof

DS-451HP

Instruction Manual

Vision

Share the wisdom and wealth for the
welfare of external and internal customers,
business associates and society at large.

Mission

Innovation, Improvement & institutionalization
shall be the pillars of our business
-Electronic Weighing Systems & Solutions
-World-class products to meet the needs of local and global market

Quality Policy

Essae-Teraoka commits itself to Total Quality
and shall constantly strive to earn "Customer Delight"
by assuring quality in all activities.

Commitment to Quality Policy,
Constancy of Purpose and Continuous
Improvement are our guiding values.

WELCOME

Essae family welcomes you to the fraternity of Essae users. We thank you for choosing our product. We, at Essae-Teraoka Limited, extend a very hearty welcome to the Essae Club and assure you of our best services for optimum utilization of our product and services. Essae family congratulates you for the choice of the machine. Thank you for the confidence reposed on us and we assure you of our best services.

We are honored by your choice and proud of our association. The journey of thousand miles will have to start with the first step. We have taken the first right step together in the journey of our business. Welcoming you once again to Essae Club and wishing you all the best.

Essae Family

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CHAPTER-1

1.1 INTRODUCTION

This Instruction manual contains information needed to perform routine maintenance and service on Essae-make DS-450/451 Series electronic weighing scales (hereinafter referred to as EWS). This manual is organized into chapters consisting or related information as set out in the table of contents.

It is strongly advised to revert to **Essae-Teraoka Pvt. Ltd.** to ensure that the EWS supplied at a particular period is covered under this manual. Since the organization follows a policy of continuous improvements of products and services, parts of the manual or the whole is subjected to changes without notice.

DISCLAIMER: Though every care is taken to ensure accuracy of the contents, Essae-Teraoka Pvt. Ltd. will not assume any responsibility for consequences resulting with use or misuse of this manual.

Thank you for purchasing a DS-450/451 series Scale from Essae. DS-450/451 series scale are manufactured to achieve high performance, fast response and durability. This manual contains installation, operation and maintenance procedures. Please read this manual completely before using the scale.

Facilities required

To install the EWS, following are the requirements as a minimum:

- A stable, even and rigid work-table where the scale can be installed and serviced.
- Away from the effect of fans, or cooler vents.
- Away from disturbances due to vibrating, rotating or reciprocating equipment.
- Away from strong magnetic fields or from equipment devices that can source EMI/RFI signals.
- Away from radiating heat sources.
- Enough work area around the machine for easy working.

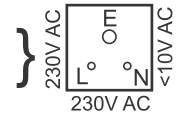
1.2 Unpacking the Weighing Platform If packed in wooden crate

- Remove the metal strip or nylon strip attached to the crate or corrugated box
- Remove the top covering plate of the wooden crate or corrugated box
- Remove the platform from the wooden crate or corrugated box by lifting the bottom frame of the platform.

NOTE : Do not lift the top frame of the platform while removing the platform from the wooden crate/corrugated box.

1.3 Initial setup for Pre Installation

- Check the packing box for any external / Internal damage due to transportation. If so, report the matter immediately to the concerned for insurance formalities.
- If the packing is O.K., open the packing gently and confirm receipt of all items as per packing check list.
- The area where the weighing platform is to be installed must be vibration free even surface and properly leveled. Improper leveling may cause inaccuracy in the weight reading.
- As for as possible the area should be free from excessive water logging and dust.
- Avoid direct sunlight, excessive temperature variation on weighing platform and indicator.
- Remove the transport lock from the platform (If applicable).
- Ensure the NEUTRAL to EARTH Voltage should be less than 10V AC as per diagram

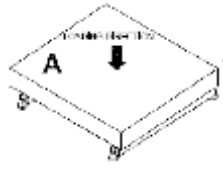


- Connect AC plug to AC mains.
- Press ON/OFF switch, this will initiate a version no. and segment checking sequence, which is followed by "0" Display.
- To override segment check, press Re-zero key once.

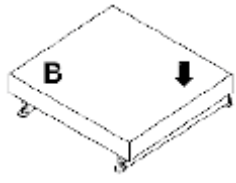
1.4 Safety precaution

Loading Limits

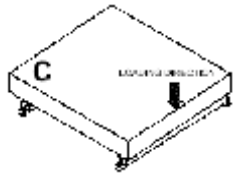
The weighing platform has such a rugged design that no damage should result if the maximum weighing capacity is occasionally exceeded. The static load-bearing capacity, i.e. the maximum permissible load, is dependent on the type of loading (positions A - C).



- Maximum permissible central load can be full capacity with distribute load.



- Maximum permissible side corner load should be 1/3rd weight of capacity



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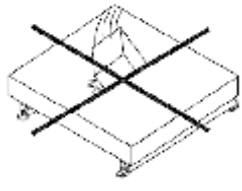
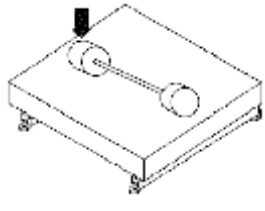


- Direct Impact load on the platform may cause severe damage to loadcell.



- When traveling across recessed weighing platforms with lift trucks and Trolley, ensure that the axle load does not exceed the maximum side load (1/3 rd weight) while traveling across the load area.

Chapter 2

2.1 General specification

Model number	DS-450/451
Description	Digital scale
Weighing unit	g or kg
Display resolution	Max. of 1/15,000 (selectable)
Internal resolution	1/6,00,000
Processor	8-bit micro-computer
ADC	24-bit precision delta-sigma
Calibration method	Software calibration
Weight & Measures	Class II & III Model approval from RRSL

Environmental condition

Power supply	230V AC, 50 Hz, +/-10%
Power consumption	11W (Max)
Operating temperature	0˚C to 45˚C
Operating humidity	Max. 85 % Rh (non - condensing)

Mechanical

Console MOC	Stainless Steel SS-304
Console dimensions	267(W)x169(D)x66(H)mm

Model approval

Class II	IND/09/98/230
Class III	IND/09/08/137

Display

Type	VFD (Vacuum florescent display)
Colour	Green
No. of digit & Size	6 digits, 13mm height

Key Board

Type	Tactile switch
No. of Key	6 keys
MOC	Polyester

Standard feature

Tare	Manual & digital
Power failure retain function	Display will show the weight with out removing the weight when power OFF & ON
Cross stand	Aluminium (where the pole not attached to platform)

Factory options: (If applicable)

Serial interface	1 X RS-232 ** Baud rate – 1200, 2400, 4800, 9600 & 19200 (selectable)
Set point output (internal)	5 X TTL Output (active high or low)
Set point relay output (external) *	2 X Potential free contact output (2 Amp. Contact current rating @ 230V AC, 50 Hz)
Current or voltage interface	4-20mA or 0-20mA or 0-24mA
Others	1. Flame proof enclosure with Zener barrier 2. Serial printing interface ** 3. In-built set point + RS-232 interface 4. Back rail for 700x800mm PF machine 5. Battery backup***

Note:

* Internal set point is must for using external relay contact output

** RS-232 or Serial printing either one is possible at a time

*** Not applicable for Flame proof machines

Flame Proof enclosure details: (If applicable)

Console MOC	Aluminum casting
Console dimensions	265(L)x234(W)x131(H)mm
Console Ingress protection	IP65
No. of keys	6
Approval authority and number	Central Institute of Mining and Fuel Research (CIMFR) CAT.No.PFC/1B/16
Zone	Zone 1 & 2
Gas Group	Gas group I, IIA & IIB atmosphere
Standard reference	FLP construction – IS 2148-2004 Design, rating, performance & T-class – IS 13346-2004
Fixing	Wall mounting (customer's scope)
Cable	Armored cable

5.3 Model DS-450/451 other series

Single Loadcell Platform

Model	Capacity (kg)	Accuracy (g)	Platform Size (mm)	Frame Work	Platter
DS-450	0.3/0.6	0.02/0.05	205x250	NA	Aluminium
DS-450	1.5/3/6/15	0.1/0.2/0.5/1	205x250	NA	SS-304
DS-450SS	3/6/15/30	0.2/0.5/1/2	360x276	SS-304	SS-304
DS-451	6/15/30	0.5/1/2	400x400	MS	SS
	60/150	5/10	450x550	MS	SS-304
	150/300	10/20	550x650	MS	SS-304
	300	20	700x800	MS	MS
	300/600	20/50	700x800	MS	SS
	600	50	700x800	MS	MSC
DS-451HP	6/15/30	0.5/1/2	360x276	SS-304	SS-304
	60/150	5/10	450x550	SS-304	SS-304
	150/300	10/20	550x650	SS-304	SS-304
	300/600	20/50	700x800	SS-304	SS-304

Four Loadcell Platform

DS-451	600/1000/1500/ 2000/3000/5000	100/200/200 500/500/1000	1000x120 1200x150 1500x180	MS	MSC
	600/1000/1500/ 2000/3000/5000	100/200/200 500/500/1000	1000x120 1200x150 1500x180	MS	SS-304
	600/1000/1500	100/200/200	1000x1200 1200x1500	SS-304	SS-304

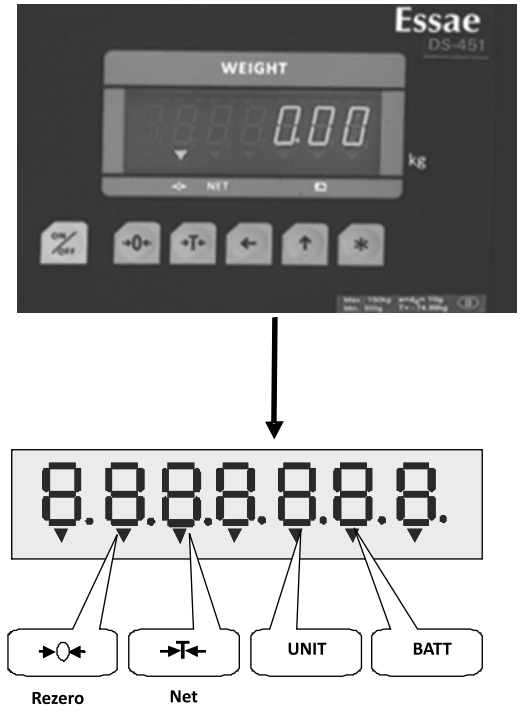
Chapter 3 Technical Information

3.1 Weighing Platform Specifications: (if applicable)

- MOC of Top Cover : MS/SS/MSC
- Over load : Safe: 150 % Ultimate: 200%
- Max. Load at corner : 1/3rd weight of rated capacity
- Rollers : MS roller (Factory option)

3.2 Display Indications

Display Layout:



Rezero : Indication ON when the net weight on the platter is Zero.

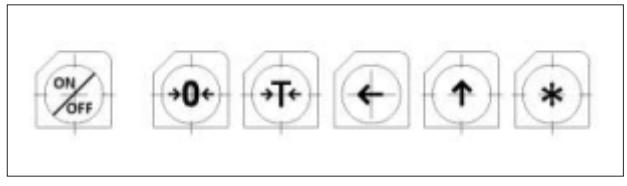
Tare : Indication ON when the EWS has a weight tared.

Unit : Indication ON when secondary unit conversion mode enabled.

BATT : Indication ON when machine working on battery power indication blinks, when the battery is low on charge.

3.3 Key Board Layout & Key Sequence

Key sheet has 6 keys that and facilitates user interaction and used to control the operations of the EWS. The functions of the keys are as below mentioned.



ON/OFF : To switch ON/OFF machine

→0← : To reset the weight to Zero

→T← : Tare the weight on platter

← : ← key is digit select during digital tare function and calibration mode.

↑ : ↑ key to increment the digit during digital tare & calibration mode.

* : * key store and transmit data in RS-232 manual mode.

NOTE: The keys also perform different function in different modes.

3.4 Battery Operation

If the EWS has the battery option, the EWS can continue to be used even when under mains power failure. The battery section consists of circuitry for battery management including DC-DC converters to derive requisite voltages required for operation of EWS In addition this section includes battery charging and protection circuitry.

Chapter 4 Functional Test

4.1 Digital Tare Programming

SL.NO	OPERATION SEQUENCE	DISPLAY	REMARKS
1	Go to weighing mode	0.000	
2	Press [↑] key	Tare XXXX.XXX	Press [DIG INC] key. The display toggles between the message Tare and current value
3	[←] [↑]	1.000	Using [DIG-SEL] and [DIG-INC] key Enter the required value
4	Press [→T←] key	-1.000	Press [TARE] key, to Tare weight reading entered
5	Press [→T←] key	0.000	Press [TARE] key to exit from the mode/switch for weighing mode.

Note : Press [✲] key to exit to weighing mode without saving the Digital Tare Settings.

4.2 Set Point Programming:

SL.No	OPERATION SEQUENCE	DISPLAY	REMARKS
1	Go to weighing mode.	0.000	
2	Press [→0←] + [↑] [↑] [↑]	SetPt-1 XXXX.XXX	Depress [REZERO] key and press [DIG-INC] key thrice in sequence. The display toggles between the message SetP-1 and current value
3	[←] [↑]	1.000	Using [DIG-SEL] and [DIG-INC] key Enter the required value
4	Press [✲]	SetPt-2	Press * key to store the value entered and advance to next.
5	[←] [↑]	2.000	Using [DIG-SEL] and [DIG-INC] key Enter the required value
6	Press [✲]	SetPt-3 XXXX.XXX	Press * Key to stores the Value entered and advance to next.
7	[←] [↑]	3.000	Using [DIG-SEL] and [DIG-INC] key Enter the required value. Repeat steps above to program SetPt 4 & 5

Note : Press [→T←] key to exit the SET POINT function.

4.3 Entering Customer specifications

SL.No	OPERATION SEQUENCE	DISPLAY	REMARKS
1	Press →0← + ← ← ←	C10 XX	Depress [Rezero] key and press [Digit select] key 3times. The display toggles between the message spec No and the current value.
2	← ↑	C10 02	Using [DIG-SEL] and [DIG-INC] key enter the required value
3	Press *	C11 XX	Press * key to store spec value entered and advance to next spec
4	← ↑	C11 11	Follow the procedure mentioned in SL.No 2 & 3. and repeat the same up to C19
5	Press →T← key	0.000	Press [TARE] key, to exit from technical specification mode

Note:
- In maintenance mode, the keys perform different functions compared to weighing mode.
- Digit blinking indicates that the particular digit is selected to change the value.
- For customer specification list refer page 11

CUSTOMER SPECIFICATION:

SPEC	MOST SIGNIFICANT DIGIT(MSD)	LEAST SIGNIFICANT DIGIT(LSD)
C10	RS232/RS485 DATA BITS & PARITY: 1 -> 8 Data Bits & NO Parity 2 -> 7 Data Bits & NO Parity 3 -> 8 Data Bits & ODD Parity 4 -> 7 Data Bits & ODD Parity 5 -> 8 Data Bits & EVEN Parity 6 -> 7 Data Bits & EVEN Parity Note 3	RS232/RS485 Baud Rate (Stop bit =1): 1 -> 1200 2 -> 2400 3 -> 4800 4 -> 9600 5 -> 19200 6 -> 38400 7 -> 57600 8 -> 115200 Note 3
C11	RS232/RS485 Weight Data Transfer: 1 -> All 2 -> Net only 3 -> Gross only 4 -> Accumulation Values only 5 -> Net and Accumulation Values only 6 -> Gross and Accumulation Values only 7-> All Weights and Accumulation Values (For Spec value 4,5,6 and 7-weight data/accumulation values transfer is possible only through RS232).	RS232 Data Transfer Mode: 1 -> Stream 2 -> Manual 3 -> Command (CTRL E) 4 -> Auto Weight Transfer 5 -> Meghdooth 6 -> Milkotronics (W1 to W9) 7 -> Manual Serial Print 8 -> Auto Serial Print 9 -> NCI 4000 (OPOS Driver)
C12	RS232/RS485 Weight Header: 1 -> No 2 -> Numeric 3 -> Alpha	RS232/RS485 Transfer Stable Weight: 0 -> No 1 -> Yes
C13	RS232 One Touch Tare from PC On Stable (T/t): 0 -> No 1 -> Yes	RS232/RS485 Data: 0 ->Variable 1 -> Fixed (8 characters)

C14	RS232 Stream Data Transfer Mode Stable Status Flag: 0 -> No 1 -> Yes	Skip "STX" Character In RS232 Output: 0 -> No 1 -> Yes
C15	Setpoint Output Type: 1 -> Active Low 2 -> Active High	Setpoint Output Logic: 1 -> Logic I (Bar Mode) 2 -> Logic II (Dot Mode) 3 -> Logic III Mode 4 -> Within MinMax 5 -> Outside MinMax
C16	Negative Setpoint Output: 0 -> No 1 -> Yes	VFD Standby Mode (In Battery): 0 -> No 1 -> 5 Minute
C17	No. of CR & LFs after Total Print: 0 -> FORM FEED 1 -> 1 CR LF 9 -> 9 CR LF	Serial Printout Format: 0 -> 80 col All Wt. 1 -> 40 col All Wt. 2 -> Net Wt only.
C18	RS232 Data Output Speed: 0 -> 50 times/sec 1 -> 25 times/sec 2 -> 17 times/sec 3 -> 13 times/sec 4 -> 10 times/sec 5 -> 8 times/sec 6 -> 7 times/sec 7 -> 6 times/sec 8 -> 5 times/sec 9 -> 4 times/sec Note : This Spec depend s Upon Individual Weight. The no of Count is less when all weight transfer	Display Blinking on Weight Stable: 0 -> No 1 -> Yes
C19	Display Secondary Unit Letter: 0 -> No 1-> 'L'(use 0.97240 cow, 1.09890 soya oil) 2 -> 'c'(use 5.00000) 3 -> 't'(use 0.08573) 4 -> 'P'(use 2.20462) (Set Unit Const using R+TTT)	Last Tare Recall On Power on: 0 -> No 1 -> Yes

C20	RS232 Data Format for Std. Modes: 0 -> Standard format 1 -> Custom data format	Quantity Enable: 0 -> No 1 -> Yes
C21	DigiIncrement Key In Weigh Mode: 0-> Digital Tare Key 1-> Hold Key	Not used
C22	SetPoint output on Stable Weight: 0-> No 1-> Yes	DigiSelect Key In Weigh Mode: 0->Secondary Unit Key 1->Net/Gross Weight Key
C23	Print Header 0-> No 1-> Print without align 2-> Print with Center align	Send Weight unit through RS232: 0->No 1->kg or respective sec unit if any 2->g or respective sec unit if any
C24	Accumulation: 0 -> No 1 ->Yes	Mode of Accumulation: 0 ->Manual 1 -> Auto
C25	Not used	Accumulation Timer for Auto Mode: 0->0.0 sec 1 ->0.5 sec 2->1.0 sec 3->1.5 sec 4->2.0 sec 5->2.5 sec 6->3.0 sec 7->3.5 sec 8->4.0 sec 9->4.5 sec

Note 1 : Default is indicated by *Highlighting* for applicable specs.
Note 2 : If a Spec is set to a value other than specified, then default function is used.
Note 3 : The Specs will take effect only at power on. So on/off is required whenever changed

4.4 Standard baud rate

- BAUD RATE 1200 / 2400 / 4800 / 9600 / 19200 / 38400 / 57600 / 115200 BPS (Selectable)
- START BIT 1 BIT
- STOP BIT 1 / 2 BIT
- DATA BIT 7 / 8 BIT
- PARITY BIT EVEN / ODD / NONE

TEXT COMMAND

Termination code	CR	The end of data	
	LF	The end of Text	0AH
Data	0 - 9	Numeric data	(30H - 39H)
	Period (Decimal point)	Period	(2EH)
	Comma	Comma	(2CH)
Numeric Weight	:	Gross Weight	(3AH)
Header	0	Net Weight	(30H)
	4	Tare Weight	(34H)
	3	Accumulation Counter	(33H)
	1	Accumulation Weight	(31H)
Alpha Weight Header	G	Gross Weight	(47H)
	N	Net Weight	(4EH)
	T	Tare Weight	(54H)
	C	Accumulation Counter	(41H)
	A	Accumulation Weight	(43H)
Weight Stable	SOH	Weight stable	(01H)
	NUL	Weight unstable	(00H)

COMMUNICATION METHOD :

By specification setting, the communication method may be selected from Stream (continuous output), Manual (Output by pressing [*] key), Command (Output by sending CTRL E), Auto weight transfer, Postal, Manual serial print and Auto serial print leading zeros are suppressed in case of accumulation counter.

General Data Format (All options are enabled from the spec)

Description	Start	Header	Weight	Field Terminal
ASCII	STX	Numeric/Alpha	Gross Wt	CR
No.of Characters	1	1	1-8	1

Description	Header	Weight	Field Terminal
ASCII	Numeric/Alpha	Net Wt	CR
No.of Characters	1	1-8	1

Description	Header	Weight	Field Terminal
ASCII	Numeric/Alpha	Tare Wt	CR
No.of Characters	1	1-8	1

Description	Header	Accumulation Values	Field Terminal
ASCII	Numeric/Alpha	Acc.Counter	CR
No.of Characters	1	1-8	1

Description	Header	Accumulation Values	END
ASCII	Numeric/Alpha	Acc.Weight	CRLF
No.of Characters	1	1-8	2

NOTE

Start “STX” command can be skipped through spec settings.

Header is optional; there may be No Header, Numeric or Alpha.

The weight data transfer varies from 1-8 characters in case of variable data length and for fixed length it is 8 characters only.

4.5 Power fail retain:

- Power fail retain function will work only when SPEC T13 to be set as 11.
- Machine should be calibrated.
- Switch “ON” the machine with A.C mains.
- Place weight on the platter.
- Switch “OFF” the A.C mains (Don’t remove weight from the platter).
- Switch “ON” the machine with A.C mains once again.
- Machine will display version followed by “PF rEt” Indication & later weight.

Note : Power fail retain function will work only for the greater than 0.5% of the full scale capacity.

Chapter 5 Preventive Measure

5.1 Preventive maintenance & Care

- EWS is a precision equipment and requires to be handled carefully.
- Store the EWS in a clean, dry and dust-free area.
- Clean the EWS periodically.
- Whenever any corrosive material is spilt on the balance, clean the same immediately.
- Never use any chemical solvents for cleaning unless specifically cleared for use.
- Use clean damp cloth to clean the exteriors of the EWS.
- Use only household detergents for removal of stubborn stains/dirt on the housing only.
- Use only Isopropyl alcohol (IPA) or Trichloroethylene (TCE) for cleaning PCB's or electronic components.
- Do not power on the EWS till the time machine is dry from all the cleaning agents.
- Ensure that the EWS is leveled as per the leveling procedures before the power is switched ON.
- Do not leave any weights on the platter when the EWS is not in use.
- Do not subject the EWS to temperature shocks (moving from a low temp. zone to high temp zone abruptly)
- Never overload the EWS with gross weights higher than its capacity(gross weight = Net weight + Tare weight). The loadcell may get deformed and can become permanently unusable. This could also result in the structural damage (brackets, housing)
- Never open the EWS when the power chord is connected to the mains. Ensure that the plug is removed from the socket before opening the EWS.
- Use only original spares supplied by Essae-Teraoka Pvt. Ltd. for replacements.
- Do not change the values of devices however minor the change appears. It affects performance of the machine.
- Use right tools for any maintenance or servicing activities.
- Perform periodic visual inspection for loose connections, broken/cut wires, and loose parts inside the EWS.
- Whenever machine is shifted to another location, level the machine again in the new location. If not, it could result in weighing inaccuracies.
- Ensure that the machine is serviced/maintained by trained and authorized personnel only.
- After servicing, ensure that the limiters are set properly to avoid permanent damage to the load cells.
- Ensure that the operational tests are conducted and cleared before reuse of the EWS after any maintenance or servicing activity. This is for the safety of the equipment as also for reliable indication.

5.2 Trouble shooting

The following table lists Common problems, Possible causes and remedies

If any assistance please contact nearest Essae Branch/authorized reseller/franchisee

Symptom	Possible Cause	Remedy
Machine not switching ON	• Check AC mains supply • AC Fuse may disconnected • AC power cord may damaged	• Check in AC socket supply • Check power cord if damage on external and call for service.
Display reading are not stable	• Unstable surface and Direct air falls	• Shift the machine firm and even surface location, avoid vibration & direct airfall
Under flow	• Check any foreign material are touch in platform • Machine platter may lifted • Load cell connecting may discard.	• Remove foreign material which is touch platform • Fix the Platter firmly • Check the cable of the load cell and connect the cable properly.
Over flow	• Weighed material more than capacity of machine.	• Check for the loaded capacity, if extra remove.
RS-232C not working	• Check for specification for RS-232 protocol baud rate, data bit, parity, stop bit, • Check COM port no.1 • RS-232 connection	• If said specification are ok and still machine is not working, contact Essae service.
No sensing	• Check for load cell cable connection may discarded	• Check the cable of the load cell and connect the cable properly.
Battery indicator flashing	• Low battery Indication • Battery may Deep discharge	• Recharge the battery • Replace the battery.
Display Shows shutoff	• Low battery Indication (battery discharged)	• Recharge battery 8 to 10 hours

Form No: IM-DS450/451-001-R06

Essae-Teraoka Pvt. Ltd.

410, 100ft Road, 4th Block,
Koramangala, Bengaluru-560 034

info@essae.com

http://www.essae.com

+91 80 2511 3021

1-800-425-3111

0-78488 12346

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