



DS-700E

SERVICE MANUAL

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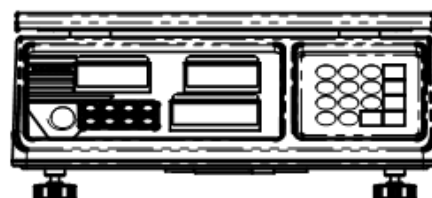
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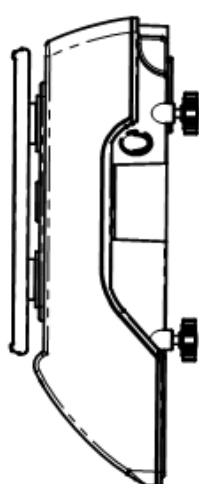
1. General Specification

1.1. General Layout

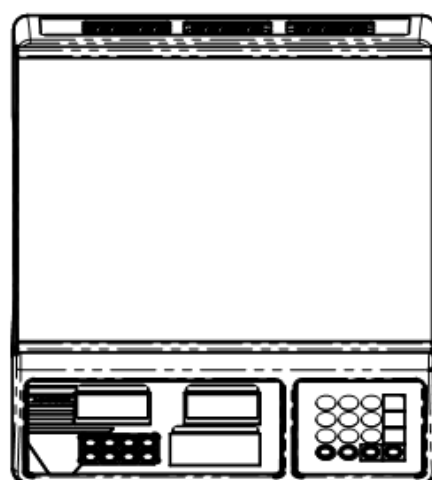
1.1.1. Bench Type



Front view



Right side view

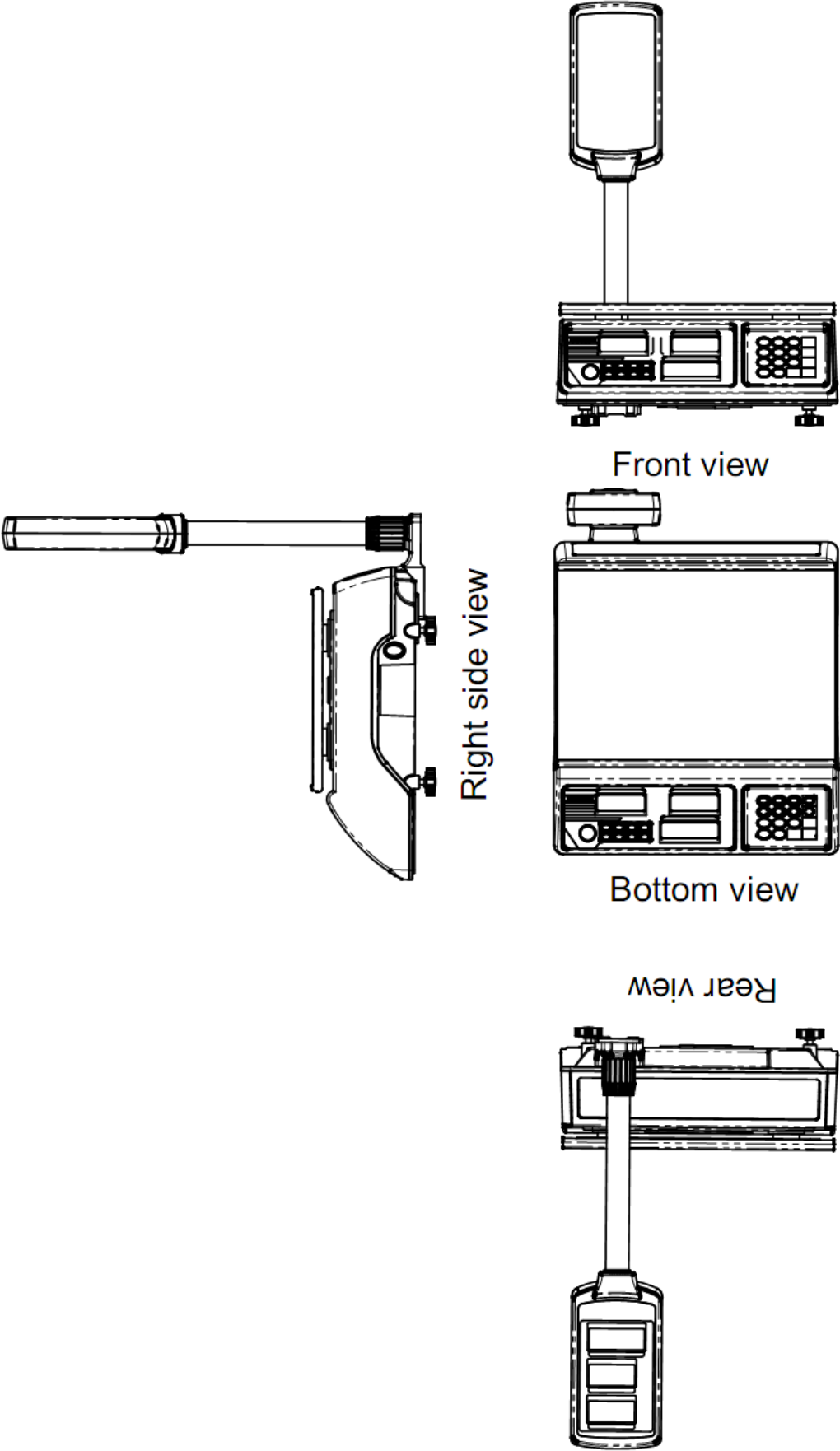


Bottom view



Rear view

1.1.2. Pole Type



1.2. Purpose

To develop a low cost LED digital price computing scale.

1.3. Features

- * Low cost digital price computing scale.
- * Quick response to weight changes.
- * Capacity: 3kg, 6kg, 15kg, 30kg, 6lb, 15lb, 30lb and 60lb.
- * Resolution: Display Resolution 1/3,000. Internal Resolution 1/90,000.
- * Rechargeable Battery backup for 12 hours of continuous usage (optional).
- * Intelligent power control
 - A. When AC power is available, scale will use AC power only whatever rechargeable battery is installed or not. When AC power is shut off, scale will use battery automatically.
 - B. When scale works on rechargeable battery, if the battery is weak, the battery indicator will light up, and the scale can not compute accurately, all displays will shut off except the Battery indicator, then power will shut off completely after 1 minute.
 - C. Scale detects rechargeable battery voltage and control battery charge process automatically. the battery charge indicator lights up when rechargeable battery is being charged.
- * Calibration by software.
- * Water proof keyboard and splash proof housing.
- * Customer and operator displays.
- * 16 switch keys / 24 switch keys (Preset key version):
 - ON/OFF key.
 - 10 Numeric keys.
 - 4 Operational keys.
 - 8 Preset keys (Preset key version only).
- * Platter Size: 340 x 243 mm.
- * Plastic housing.
- * LED display.

1.4. Operating Conditions

- * Power Source : AC 240/230/220V, 117/100V.
: DC 6V 5.5Ah rechargeable battery (optional).
- * Operating Temperature: -10°C... +40°C (OIML).
- * Operating Humidity : 15 ... 85% RH.
- * Power Consumption : 18W when using AC power.
: 3W when using rechargeable battery.

1.5. Charging Conditions (for Rechargeable battery only)

- * Power Source : AC 240/230/220V, 117/100V (Factory Setup).
- * Charge Current : 800 mA.
- * Charge Time : 8 to 10 hours.

1.6. Analog Specification

- * Input sensitivity : 1mV/V.
- * Zero adjust range : 0 $\pm$ 2.5mV.
- * Zero balance range : 0 $\pm$ 0.5mV.
- * L/C applied voltage : DC 5V.
- * Speed of A/D conversion: 4 times/sec.
- * Internal Resolution : 90,000.

1.7. Capacity/Minimum Graduation/Tare range

1.7.1. Single Interval

Capacity	Minimum Graduation	Tare Rang
3kg	1g (1e = 30IR)	0 - 1.499kg
6kg	2g (1e = 30IR)	0 - 2.998kg
15kg	5g (1e = 30IR)	0 - 7.495kg
30kg	10g (1e = 30IR)	0 - 14.99kg
6lb	0.002lb (1e = 30IR)	0 - 2.998lb
15lb	0.005lb (1e = 30IR)	0 - 7.495lb
30lb	0.01lb (1e = 30IR)	0 - 14.99lb
60lb	0.02lb (1e = 30IR)	0 - 29.98lb

1.7.2. Multi-Interval

Capacity	Minimum Graduation		Tare Rang
3kg	1g (1e = 10IR)		0 - 1.499kg
6kg	(0-3kg)-1g (1e=15IR)	(3-6kg)-2g (1e=30IR)	0 - 2.999kg
15kg	(0-6kg)-2g (1e=12IR)	(6-15kg)-5g (1e=30IR)	0 - 5.998kg
30kg	(0-15kg)-5g (1e=15IR)	(15-30kg)-10g (1e=30IR)	0 - 9.995kg
6lb	(0-3lb)-0.001lb (1e=15IR)	(3-6lb)-0.002lb (1e=30IR)	0 - 2.999lb
15lb	(0-6lb)-0.002lb (1e=12IR)	(6-15lb)-0.005lb (1e=30IR)	0 - 5.998lb
30lb	(0-15lb)-0.005lb (1e=15IR)	(15-30lb)-0.01lb (1e=30IR)	0 - 9.995lb
60lb	(0-30lb)-0.01lb (1e=15IR)	(15-30lb)-0.02lb (1e=30IR)	0 - 29.99lb

*NOTE: IR -> Internal Resolution, e -> Division (Minimum Increment).

Internal count (full capacity) = 90,000IR.

1.8. Display and Indicators

1.8.1. Display Specifications

- * Weight Display : 5 digits.
- * Unit Price Display: 5 digits.
- * Total Price Display: 6 digits.

1.8.2. Indicators

- 8.2.1. Export Version
 - *  : On when zero point is adjusted and weight is stable.
 - * NET : On when tare operation is performed.
 - * MEM : On when price is accumulating.
 - *  : On when Battery is weak and needs to charge (rechargeable battery only).
 - * CHARGE: On when Battery is charging (only for rechargeable battery type).

1.9. Dimensions

- * Platter size: 340 x 243 mm.
- * Overall size: 354 x 348 x 115 mm.

1.10. External Connectors

- * AC receptacle.
- * RJ-45 interface Serial Port (Optional).
 - a) Normal RS-232C communication with external device.
 - b) Connection with ECR: QUTA TRADING, IBN, HUGIN, ICL (OLD, OLD OMRON), ICL (PORTUGAL), ICL (ACTUAL, ACTUAL OMRON), CAS, NIXDORF, NCR, MONS and WTN.

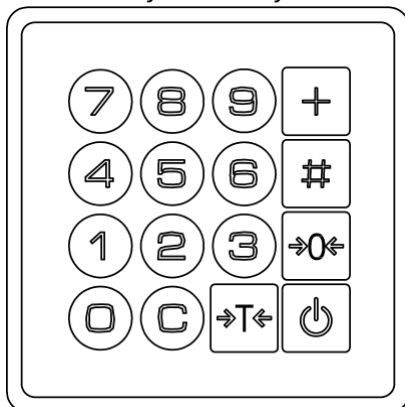
1.11. Main Components

- * Microcomputer: Hitachi HD6473644 (8 Bit, 32K PROM)/HD6433644 (8 Bit, 32K ROM)/HD6433643 (8 Bit, 24K ROM) / HD6433642 (8 Bit, 16K ROM).
- * Crystal Oscillator : 10 MHz.
- * Display Device : LED.
- * Load-cell : 1k Impedance Load-cell.

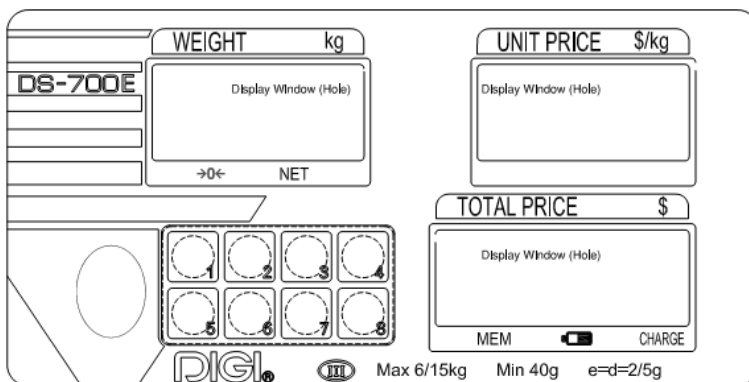
1.12. Existing parts to be used

- * P type Load-cell (DS-685).

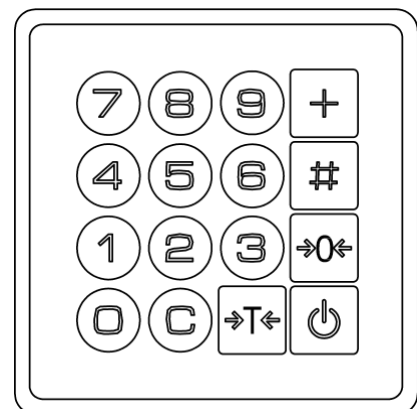
1.13. Key Sheet Layout



Keysheet Type A

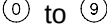


Keysheet Type B

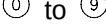
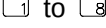


1.14. Key Functions

1.14.1. Type A (Standard export version)

-  : ON/OFF key. Turns the power ON or OFF.
-  : RE-ZERO key. Resets weight display to zero.
-  : AMT/TEND key. Enters amount tendered. SPEC 18 BIT 0 can select two different types of AMT/TEND method.
-  : Accumulation key. Adds sum or accumulate sum.
-  : TARE key. Set or clears tare value.
-  : CLEAR key. Clears numerical values.
-  : Numeric keys.

1.14.2. Type B (Preset key export version)

-  : ON/OFF key. Turns the power ON or OFF.
-  : RE-ZERO key. Resets weight display to zero.
-  : AMT/TEND key. Enters amount tendered. Two different types of AMT/TEND operation can be selected by SPEC 18 BIT 0.
-  : Accumulation key. Adds sum or accumulate sum.
-  : TARE key. Set or clears tare value.
-  : CLEAR key. Clears numerical values.
-  : Numeric keys.
-  : PRESET keys. Set up or call either unit price.

1.15. Notable differences from current Teraoka scales:

- * Low cost LED digital price computing scale.

2. Maintenance Mode

2.1. Location of Span Switch

Span Switch is a black small mechanical switch located on the backside of main board. Please open the top cover and press this black switch when scale is powered on, after that the display will shows DS700E Vr X.XX S-On, it means the SPAN SWITCH is enabled.

2.2. SPAN Adjustment

1 - ZERO 2 - NET 3 - MEMORY 4 - BATTERY

OPERATION	WEIGHT	U.PRICE	T.PRICE	1	2	3	4	REMARKS
	0.0 0 0	0.0 0	0.0 0	▼				Weighing mode.
SPAN Switch ON	D S 7 8 8	V r x . x x	S - O n					
[Re-Zero]	8 8 8 8 8	8 8 8 8 8	888888					Enter 8 7 1 5 while pressing
[Re-Zero] + [8] [7] [1] [5]	C A L 0 0							Ensure no weight on platter
[Re-Zero*]	- - - - -							Calibrating zero point.
:								
:								
:								
	C A L S P							Put full capacity weight on
[Re-Zero]	- - - - -							platter (e.g. 15kg)
								Calibrating Span.
After calibration	1 5.0 0 0	0.0 0	0.0 0	▼				Back to Weighing mode.

2.3. Escape from Calibration mode

1 - ZERO 2 - NET 3 - MEMORY 4 - BATTERY

OPERATION	WEIGHT	U.PRICE	T.PRICE	1	2	3	4	REMARKS
	0.0 0 0	0.0 0	0.0 0	▼				Weighing mode.
SPAN Switch ON	D S 7 8 8	V r x . x x	S - O n					
[T]	0.0 0 0	0.0 0	0.0 0	▼				Escape to Weighing mode.
SPAN Switch ON	D S 7 8 8	V r x . x x	S - O n					
[Re-Zero]	8 8 8 8 8	8 8 8 8 8	888888					Enter 8 7 1 5 while pressing
[Re-Zero] + [8] [7] [1] [5]	C A L 0 0							RE-ZERO.
[T]	0.0 0 0	0.0 0	0.0 0	▼				Escape to Weighing mode.
SPAN Switch ON	D S 7 8 8	V r x . x x	S - O n					
[Re-Zero]	8 8 8 8 8	8 8 8 8 8	888888					Enter 8 7 1 5 while pressing
[Re-Zero] + [8] [7] [1] [5]	C A L 0 0							RE-ZERO.
Ensure no weight on platter, [*]	- - - - -							Calibrating zero point.
:								
:								
	C A L S P							
[T]	0.0 0 0	0.0 0	0.0 0	▼				Escape to Weighing mode.

2.4. Specification Setting

2.4.1. Specification Enter (141)

1 - ZERO 2 - NET 3 - MEMORY 4 - BATTERY

OPERATION	WEIGHT	U.PRICE	T.PRICE	1	2	3	4	REMARKS
[RE-ZERO]	8 8 8 8 8	8 8 8 8 8	888888					Enter 1 4 1 while depressing
[RE-ZERO] + [1] [4] [1]	S P C 0 0	0 0 0 0	0 0 0 0					RE-ZERO.
[+]	S P C 0 1	0 0 0 0	0 0 0 0					+ Key only increases Specification.
[#]	S P C 0 0	0 0 0 0	0 0 0 0					# key only decrease Specification.
[0] [1] [0] [1]	S P C 0 0	0 0 0 0	0 1 0 1					Only 1 & 0 are enable.
[RE-ZERO]	S P C 0 1	0 0 0 0	0 0 0 0					'RE-ZERO' to store Specification.
[#]	S P C 0 0	0 1 0 1	0 0 0 0					
[#]	S P C 0 3	0 0 0 0	0 0 0 0					
[T]	0.0 0 0	0.0 0	0.0 0	▼				Store SPECS to EEPROM & escape to Weighing mode.

2.4.2. Specification Enter (142)

NOTE: It can work only when SPAN SWITCH is on (Enable).

1 - ZERO 2 - NET 3 - MEMORY 4 - BATTERY

OPERATION	WEIGHT	U.PRICE	T.PRICE	1	2	3	4	REMARKS
	0.0 0 0	0. 0 0	0.0 0	▼				Weighing mode.
SPAN Switch ON	D S 7 8 8	V r x. x x	S - O n					
[RE-ZERO]	8 8 8 8 8	8 8 8 8 8	888888					Enter 1 4 2 while depressing
[RE-ZERO] + [1] [4] [2]	S P C 0 8	0 0 0 0	0 0 0 0					RE-ZERO.
[+]	S P C 0 9	0 0 0 0	0 0 0 0					+ key only increase Specification.
[+]	S P C 1 0	0 0 0 0	0 0 0 0					+ key only increase Specification.
[1] [0] [1] [1]	S P C 1 0	0 0 0 0	1 0 1 1					Only 1 & 0 are available.
[RE-ZERO]	S P C 1 1	0 0 0 0	0 0 0 0					Re-Zero store Specification
[#]	S P C 1 0	1 0 1 1	0 0 0 0					# key only decrease Specification
[+]	S P C 1 1	0 0 0 0	0 0 0 0					
[1] [1] [1] [1]	S P C 1 1	0 0 0 0	1 1 1 1					
[C]	S P C 1 1	0 0 0 0	0 0 0 0					
[1] [0] [1] [0]	S P C 1 1	0 0 0 0	1 0 1 0					
[RE-ZERO]	S P C 1 2	0 0 0 0	0 0 0 0					RE-ZERO to store Specification.
[+]	S P C 1 3	0 0 0 0	0 0 0 0					
[T]	0.0 0 0	0.0 0	0.0 0	▼				Store SPECS to EEPROM & Escape to Weighing mode.

2.5. Internal Count & A/D Count Display

1 - ZERO 2 - NET 3 - MEMORY 4 - BATTERY

OPERATION	WEIGHT	U.PRICE	T.PRICE	1	2	3	4	REMARKS
[RE-ZERO]	8 8 8 8	8 8 8 8	888888					Enter 009 while depressing RE-ZERO weight and unit price column displays A/D Count, Total Price column display Internal Count.
[RE-ZERO] + [0] [0] [9]	1	1 8 9 9 2	0					
[T]	0.0 0 0	0.0 0	0.0 0	▼				T key to go back Weighing mode.

2.6. Tax Setting (Available when SPEC9.BIT1 = 0)

1 - ZERO 2 - NET 3 - MEMORY 4 - BATTERY

OPERATION	WEIGHT	U.PRICE	T.PRICE	1	2	3	4	REMARKS
	0.0 0 0	0.0 0	0.0 0	▼				Weighing mode.
[RE-ZERO]	8 8 8 8	8 8 8 8	88888					Enter 9 9 9 while pressing RE-ZERO.
[RE-ZERO] + [9] [9] [9]	t A	0.0 0	0.0 0					Enter Tax Rate, e.g. 3.00%. RE-ZERO to store specification.
[3] [0] [0]	t A	0.0 0	3.0 0					
[RE-ZERO]	r d 4 5	3.0 0	0.0 0					Depress 'C' to select Cut Off
[C]	C U t O F	3.0 0	0.0 0					Or Rounding. Store Tax Rate to EEPROM & return to Weighing mode.
[C]	r d 4 5	3.0 0	0.0 0					
[T]	0.0 0 0	0.0 0	0.0 0	▼				

2.7. Operational Specification List

2.7.1. For the Customer - (1 4 1)

Spec#	BIT 3	BIT 2	BIT 1	BIT 0
0	Auto Power-Off (No key & weigh operation) 0000: Auto power-off disabled 0001: 3 minute 0010: 10 minutes 0011: 30 minutes 0100: 1 hour 0101: 3 hours 0110 ~ 1111: Not used			
1	Buzzer 0: On 1: Off	Error Alarm 0: On 1: Off	Currency Conversion Operation Method 00: Inhibit 01: Method 1	10: Method 2 11: Not used
2	Decimal Point Position on Currency Conversion Rate 000: 7th digit (0.000000) 100: 3rd digit (0000.00) 001: 6th digit (0.00000) 101: 2nd digit (00000.0) 010: 5th digit (00.0000) 110: No decimal point (000000) 011: 4th digit (000.000) 111: Not used			Not Used
3	RS-232C RTS/CTS Handshaking 0: On 1: Off	Baud rate of RS-232C 000: 1200 bps 001: 2400 bps 010: 4800 bps 011: 9600 bps 100: 19200 bps 101: Not used 110: Not used 111: Not used		
4	Stop Bit of RS-232C 0: 1 bit 1: 2 bit	Data Length 0: 7 bit 1: 8 bit	Parity of RS-232C 00: None 10: Even 01: Odd 11: Not used	

Spec#	BIT 3	BIT 2	BIT 1	BIT 0
5	Data transfer mode of RS-232C *Note: 0000~0011: V1.03, 0100~1101: V1.30 0000: Inhibit data transfer 0001: Stream Output mode 0010: Manual mode 0011: Standard Command Mode 0100: QUQA Trading 0101: IBM, HUGIN interface 0110: ICL (OLD, OLD OMRON) I/F 0111: ICL (PORTUGAL) interface 1000: ICL (ACTUAL, ACTUAL OMRON) interface 1001: CAS 1010: NIXDORF interface 1011: NCR Interface 1100: MONS Interface 1101: WTN (Sending Key P4) 1110: CAS (Portugal) *V1.39 1111: Others *V1.33			
6	Interval of time out error of RS-232C 00: 1 second 01: 3 second 10: 5 second 11: 10 second		Transmission Condition 0: Weight stable 1: Unconditional	Additional Parity Code in Text 0: No 1: Yes
7	Tare Weight in Text 0: No 1: Yes	Unit Price in Text 0: No 1: Yes	Total Price Weight in Text 0: No 1: Yes	Min. Weight (≥20e) Limitation for RS-232 Data Output 0: No 1: Yes *V1.37
8	Data Transfer Mode of RS-232C (*Valid only when SPEC 5 = 1111) 0000: GAOTENG Type (Sending Key P4) *V1.33 0001: SHARP TK300/ UP700 Type *V1.41 0010: NCI4000 Type *V1.39 0011: DATECS MP50/500 *V1.35 0100 ~ 1111 - Not used			
9 - 11	Not Used	Not Used	Not Used	Not Used

2.7.2. For Weight & Measure - (1 4 2)

NOTE: It can work only when the SPAN Switch is on (Enable)

Spec#	BIT 3	BIT 2	BIT 1	BIT 0
12	Version Display When Power On 0: Allow 1: Inhibit	Segment-Check Style 0: Fast 1: Standard	Start Range 00: ±10% F.S. 10: ±3% F.S. 01: ±5% F.S. 11: ±2% F.S.	
13	Price Base 00: \$ / kg 10: \$ / lb 01: \$ / 100g 11: \$ / 1/4lb		Re-Zero Function 0: Allow 1: Inhibit	Auto Zero Function 0: Allow (for Japan) 1: Inhibit
14	Decimal Point Position on Weight Display 00: No decimal 10: 3rd digit (000.00) 01: 2nd digit (0000.0) 11: 4th digit (00.000)		Decimal Point Position for Unit & Total Price Display 00: No decimal point 10: 3rd digit (000.00) 01: 2nd digit (0000.0) 11: 4th digit (00.000)	
15	Minimum Display 00: 1 10: 5 01: 2 11: 10		Selection of Display Resolution 00: 1/3000 10: 1/7500 01: 1/6000 11: Not used	
16	Weight Range 0: Single range 1: Multi-range	Negative Weight Display Mask 0: Minus gross > 9e 1: Minus gross Weight	Rounding for Total Price 00: Rounding 10: Cut up 01: Truncation 11: Not used	
17	Additional Rounding for Total Price 000: No additional rounding 100: Rounding for 1 st digit 001: 1/4 rounding (25 step) 101: Truncate 1 st digit 010: Special rounding (5 step) 110: Cut up 1 st digit 011: 5 floor rounding (0-4 ->0, 5-9 ->5) 111: Not used			Additional Rounding for kati Display 0: Allow 1: Inhibit

Spec#	BIT 3	BIT 2	BIT 1	BIT 0
18	Manual Tare Cancel 0: Allow 1: Inhibit	Tare Subtraction 0: Allow 1: Inhibit	Tare Accumulation 0: Allow 1: Inhibit	Tare Clear Re-Zero 0: Allow (Japan) 1: Inhibit
19	Digital Tare 0: Allow 1: Inhibit	Accumulation When Tare 0: Allow 1: Inhibit	Zero Tracking When Tare 0: Allow 1: Inhibit	Weight Reset When Tare 0: Allow 1: Inhibit
20	Tare Auto Clear 0: Allow 1: Inhibit	Unit Price Auto Clear 0: Allow 1: Inhibit	Price Base Auto Clear 0: Allow (For UK) 1: Inhibit	Auto Clear Condition 0: >= Gross 21e & >= Net 5e 1: >=Net 1e & price not 0
21	Currency Conversion 0: Allow 1: Inhibit	Tax 0: Allow 1: Inhibit	Price Base Toggle (100g/kg, 1/4lb/lb) 0: Allow (For UK) 1: Inhibit	Not Used
22	Change Function 0: Allow 1: Inhibit	Change Operation Method 0: Indirect method B 1: Direct method A	Mode Set Key 0: Allow 1: Inhibit	Preset Key 0: Allow 1: Inhibit
23	UNIT Key Conversion Function Definition 000: No function 010: For kg, decimal lb and kati (HK only) 001: Between kg and lb 011 ~ 111: Not used			IR Mode Protected By SPAN SW 0: No 1: Yes
24	Accumulation 0: Allow 1: Inhibit	Accumulation Number Display 0: Allow 1: Inhibit	Display Style for Accumulation 0: Standard "total" 1: Japan ("Add")	WT Data Sync (+ key only) 0: Allow 1: Inhibit
25	Exit From Accumu. Mode After 15 sec 0: Allow 1: Inhibit	Exit from Accumu. Mode When Weight Changed 0: Allow 1: Inhibit	Price Accumulation Without Remove Weight 0: Allow 1: Inhibit	Price Accumulation Without Change Weight (>= ±10e) 0: Allow 1: Inhibit
26	Decimal Point Position on Price Display in Secondary Currency 00: No decimal point 10: 3rd digit (000.00) 01: 2nd digit (0000.0) 11: 4th digit (00.000)		Rounding for Currency Conversion 00: Rounding 10: Cut up 01: Truncation 11: Not used	
27	Exit from Second Currency Mode When Weight Change >±2e 0: Allow 1: Inhibit	Currency Symbol For Second Currency 0: No symbol 1: 'EURO'	Indicator for Second Currency 0: Allow 1: Inhibit	Inverse Currency Conversion Function 0: Allow 1: Inhibit
28	Non-weighing item Accumulation V1.03 0: Allow 1: Inhibit	Not Used	Weight stability condition *V1.35 00 : Loose 10 : Tight 01 : Normal 11 : Stringent	
29 - 31	Not Used	Not Used	Not Used	Not Used

Note: Please set the Not Used items as 1.

3. Main Operations

3.1. ON/OFF

1 - ZERO 2 - NET 3 - MEMORY 4 - BATTERY

OPERATION	WEIGHT	U.PRICE	T.PRICE	1	2	3	4	REMARKS
[ON/OFF]	8.8.8.8.8.	8.8.8.8.8.	8.8.8.8.8.8.					Display for 1 seconds. *Note1
								Blank for 1 seconds.
	8.8.8.8.8.	8.8.8.8.8.	8.8.8.8.8.8.					Display for 1 seconds.
								Blank for 1 seconds.
	8 8 8 8 8	8 8 8 8 8	8 8 8 8 8 8					
Ready to operate	0.0 0 0	0.0 0	0.0 0	▼				Weighing mode.
[ON/OFF]								OFF.

*Note1: Power On Segment Check Style can be selected by setting SPEC12.2. In this example assume SPEC12.2 = 0.

3.2. Tare Subtraction

3.2.1. One Touch Tare Subtraction

1 - ZERO 2 - NET 3 - MEMORY 4 - BATTERY

OPERATION	WEIGHT	U.PRICE	T.PRICE	1	2	3	4	REMARKS
	0.0 3 0	0.0 0	0.0 0					Put tare (e.g. 30 g) on platter.
[T]	0.0 0 0	0.0 0	0.0 0		▼			Subtract the tare weight.
Remove the tare weight	- 0.0 3 0	0.0 0	0.0 0	▼	▼			
[T]	0.0 0 0	0.0 0	0.0 0	▼				Clear the tare weight.

3.2.2. Digital Tare Subtraction

1 - ZERO 2 - NET 3 - MEMORY 4 - BATTERY

OPERATION	WEIGHT	U.PRICE	T.PRICE	1	2	3	4	REMARKS
[5]	0.0 0 0	0.0 5	0.0 0	▼				Key in the tare weight (e.g 5g).
[T]	- 0.0 0 5	0.0 0	0.0 0	▼	▼			Subtract the tare weight (Assume 15kg).
[T]	0.0 0 0	0.0 0	0.0 0	▼				Clear the tare weight.

3.3. Plural Operation

3.3.1. Standard Version

1 - ZERO 2 - NET 3 - MEMORY 4 - BATTERY

OPERATION	WEIGHT	U.PRICE	T.PRICE	1	2	3	4	REMARKS
[1] [2] [5] [0]	0.0 0 0	1 2.5 0	0.0 0	▼				Enter unit price.
Put product on platter	0.4 2 0	1 2.5 0	5.2 5					
[+]	t O t A L	1	5.2 5			▼		Accumulation the data.
Remove product	t O t A L	1	5.2 5			▼		
[5] [0] [0]	0.0 0 0	5.0 0	0.0 0	▼		▼		Enter unit price.
[+]	t O t A L	2	1 0.2 5			▼		Fixed price accumulation.
[C]	0.0 0 0	0.0 0	0.0 0	▼				Clear current total then return to Weighing mode.
[+]	t O t A L	0	0.0 0					Enter accumulation mode.
[+]	t O t A L	0	0.0 0					Nothing happen.
[C]	0.0 0 0	0.0 0	0.0 0	▼				Return to Weighing mode.

3.3.2. Japan Type A Version (When SPEC24.BIT1 = 1 and SPEC24.2 = 0)

1 - ZERO 2 - NET 3 - MEMORY 4 - BATTERY

OPERATION	WEIGHT	U.PRICE	T.PRICE	1	2	3	4	REMARKS
[1] [0] [0] [0]	0.0 0 0	1 0.0 0	0.0 0	▼				Enter unit price.
Put product on platter.	0.5 0 0	1 0.0 0	5.0 0					
[+]	A d d	1]	5.1 5			▼		Accumulate data (tax rate=3%).
Remove product	A d d	1]	5.1 5			▼		
[1] [5] [0] [0]	0.0 0 0	1 5.0 0	0.0 0	▼		▼		Enter unit price.
[+]	A d d	2]	2 0.6 0			▼		Fixed price accumulation.
[C]	0.0 0 0	0.0 0	0.0 0	▼				Clear current total then return to Weighing mode.
[+]	A d d	0]	0.0 0					Enter accumulation mode.
[C]	0.0 0 0	0.0 0	0.0 0	▼				Return to Weighing mode.

3.3.3. Japan Type B Version (When SPEC24.BIT1 = 1 and SPEC24.2 = 1)

1 - ZERO 2 - NET 3 - MEMORY 4 - BATTERY

OPERATION	WEIGHT	U.PRICE	T.PRICE	1	2	3	4	REMARKS
[1] [0] [0] [0]	0.0 0 0	1 0.0 0	0.0 0	▼				Enter unit price.
Put product on platter.	0.5 0 0	1 0.0 0	5.0 0					
[+]	A d d	5.0 0	5.1 5			▼		Accumulate data (tax rate=3%).
Remove product	A d d	5.0 0	5.1 5			▼		
[1] [5] [0] [0]	0.0 0 0	1 5.0 0	0.0 0	▼		▼		Enter unit price.
[+]	A d d	2 0.0 0	2 0.6 0			▼		Fixed price accumulation.
[C]	0.0 0 0	0.0 0	0.0 0	▼				Clear current total then return to Weighing mode.
[+]	A d d	0.0 0	0.0 0					Enter accumulation mode.
[C]	0.0 0 0	0.0 0	0.0 0	▼				Return to Weighing mode.

3.4. AMT/TEND Key Operation

3.4.1. Method A (Direct entry method: SPEC 18.BIT0 = 1)

1 - ZERO 2 - NET 3 - MEMORY 4 - BATTERY

OPERATION	WEIGHT	U.PRICE	T.PRICE	1	2	3	4	REMARKS
[1] [2] [5] [0]	0.0 0 0	1 2.5 0	0.0 0	▼				Enter unit price.
Put product on platter.	0.4 2 0	1 2.5 0	5.2 5					
[+]	t O t A L	1	5.2 5			▼		Accumulation the data.
Remove product	t O t A L	1	5.2 5			▼		
[6] [0] [0]	0.0 0 0	6.0 0	0.0 0	▼		▼		Enter the amount tendered.
[#]	C H G	6.0 0	0.7 5			▼		Compute and display change.
[C]	0.0 0 0	0.0 0	0.0 0	▼				Clear current total then return to Weighing mode.
[+]	t O t A L	0	0.0 0					Check total data.
[C]	0.0 0 0	0.0 0	0.0 0	▼				Return to Weighing mode.

3.4.2. Method B (Indirect entry method: SPEC 18.BIT0 = 0)

1 - ZERO 2 - NET 3 - MEMORY 4 - BATTERY

OPERATION	WEIGHT	U.PRICE	T.PRICE	1	2	3	4	REMARKS
[1] [2] [5] [0]	0.0 0 0	1 2.5 0	0.0 0	▼				Enter unit price.
	0.4 2 0	1 2.5 0	5.2 5					Put product on platter.
[+]	t O t A L	1	5.2 5			▼		Accumulation the data.
[#]	C H G	5.2 5	0.0 0			▼		Prepare to compute change.
[6] [0] [0]	C H G	6.0 0	0.7 5			▼		U.Price column display tendered amount while T.Price column display computed change.
Remove product	C H G	6.0 0	0.7 5			▼		
[C]	0.0 0 0	0.0 0	0.0 0	▼				Clear current total then Return to Weighing mode.
[+]	t O t A L	0	0.0 0					Check total data.
[C]	0.0 0 0	0.0 0	0.0 0	▼				Return to Weighing mode.

3.5. Price Base Change By 100g/kg Key (Available when SPEC 14.BIT0 = 0)

1 - ZERO 2 - NET 3 - MEMORY 4 - BATTERY 5 - kg 6 - 100g

OPERATION	WEIGHT	U.PRICE	T.PRICE	1	2	3	4	5	6	REMARKS
[1] [0] [0]	0.0 0 0	1.0 0	0.0 0	▼				▼		Key in unit price.
[100g/kg]	0.0 0 0	1.0 0	0.0 0	▼				▼		Change price base to \$/100g.
Put product on platter.	1.0 0 0	1.0 0	1 0.0 0					▼		
[C]	1.0 0 0	0.0 0	0.0 0					▼		C key clear unit price and price base.
[100g/kg]	1.0 0 0	0.0 0	0.0 0					▼		Change price base to \$/100g.
[2] [0] [0]	1.0 0 0	2.0 0	2 0.0 0					▼		Key in unit price.
[100g/kg]	1.0 0 0	2.0 0	2.0 0					▼		Change price base to \$/kg.
Remove product, [C]	0.0 0 0	0.0 0	0.0 0	▼				▼		

3.6. Auto Zero Operation

1 - ZERO 2 - NET 3 - AUTOZERO 3 - MEMORY 4 - BATTERY

OPERATION	WEIGHT	U.PRICE	T.PRICE	1	2	3	4	5	REMARKS
	0.0 0 0	0.0 0	0.0 0	▼					Weighing mode.
Put 5g on platter.	0.0 0 5	0.0 0	0.0 0			▼			Auto Zero function is ineffective.
[AUTO ZERO]	0.0 0 0	0.0 0	0.0 0		▼				Auto Zero function is effective.
Add 20g on platter.	0.0 2 5	0.0 0	0.0 0		▼				Exceed Auto Zero range (<5e).
Remove 20g	0.0 0 0	0.0 0	0.0 0		▼				
[AUTO ZERO]	0.0 0 5	0.0 0	0.0 0						Auto Zero function is cancelled.

3.7. kg and lb conversion by UNIT Key (Available when SPEC15 = 001x)

1 - ZERO 2 - NET 3 - MEMORY 4 - BATTERY 5 - \$/kg 6 - \$/lb

OPERATION	WEIGHT	U.PRICE	T.PRICE	1	2	3	4	5	6	REMARKS
Put product on platter.	0.5 0 0	0.0 0	0.0 0					▼		Weight in kg.
[2] [0] [0]	0.5 0 0	2.0 0	1.0 0					▼		Key in unit price in \$/kg.
Remove product, [C]	0.0 0 0	0.0 0	0.0 0	▼				▼		
[UNIT]	0.0 0 0	0.0 0	0.0 0						▼	Change to lb.
Put product on platter.	1.1 0 0	0.0 0	0.0 0					▼		Weight in lb.
[2] [0] [0]	1.1 0 0	2.0 0	2.2 0					▼		Key in unit price in \$/lb.
[UNIT]	0.5 0 0	2.0 0	1.0 0					▼		Change to kg.
Remove product, [C]	0.0 0 0	0.0 0	0.0 0	▼				▼		

3.8. kg, decimal lb and kati conversion by UNIT Key (Available when SPEC 15 = 010X)

1 - ZERO 2 - NET 3 - MEMORY 4 - BATTERY 5 - \$/lb 6 - \$/kati

OPERATION	WEIGHT	U.PRICE	T.PRICE	1	2	3	4	5	6	REMARKS
Put product on platter.	0.5 0 0	0.0 0	0.0 0							Weight in kg.
[2] [0] [0]	0.5 0 0	2.0 0	1.0 0							Key in unit price in \$/kg.
Remove product, [C]	0.0 0 0	0.0 0	0.0 0	▼						
[UNIT]	0. 0.0	0.0 0	0.0 0					▼		Change to decimal lb.
Put product on platter.	1. 1.6	0.0 0	0.0 0					▼		Weight in decimal lb.
[2] [0] [0]	1. 1.6	2.0 0	2.2 0					▼		Key in unit price in \$/kati.
Remove product, [C]	0.0 0 0	0.0 0	0.0 0	▼				▼		
[UNIT]	0. 0.0	0.0 0	0.0 0						▼	Change to kati.
Put product on platter.	0.1 3.2	0.0 0	0.0 0					▼		Weight in kati.
[2] [0] [0]	0.1 3.2	2.0 0	1.6 5					▼		Key in unit price in \$/kati.
[UNIT]	0.5 0 0	2.0 0	1.0 0							Change to kg.
Remove product, [C]	0.0 0 0	0.0 0	0.0 0	▼						

3.9. Currency Conversion by EURO Key (Available when SPEC 15.BIT0 = 0)

3.9.1. Currency Conversion Operation Method 1 (SPEC 1 = XX01)

1 - ZERO 2 - NET 3 - MEMORY 4 - BATTERY

OPERATION	WEIGHT	U.PRICE	T.PRICE	1	2	3	4	REMARKS
Put product on platter.	0.5 0 0	0.0 0	0.0 0					
[2] [0] [0]	0.5 0 0	2.0 0	1.0 0					Key in unit price.
[EURO]	E U R O		2.2 0					Display re-calculated total price in secondary currency. Assume SPEC26.3 = 1, conversion rate is 2.20.
[EURO]	0.5 0 0	2.0 0	1.0 0					Return to Weighing Mode.

3.9.2. Currency Conversion Operation Method 2 (SPEC 1 = XX10)

1 - ZERO 2 - NET 3 - MEMORY 4 - BATTERY

OPERATION	WEIGHT	U.PRICE	T.PRICE	1	2	3	4	REMARKS
Put product on platter.	0.5 0 0	0.0 0	0.0 0					
[2] [0] [0]	0.5 0 0	2.0 0	1.0 0					Key in unit price.
[EURO]	E U R O	4.4 0	2.2 0					Display re-calculated unit price & total price in secondary currency. Assume SPEC26.3 = 1, conversion rate is 2.20.
[EURO]	0.5 0 0	2.0 0	1.0 0					Return to Weighing Mode.

3.10. Operations of Mode Set Key

3.10.1. Preset Key Setting (Available when SPEC 14.BIT1 = 0)

1 - ZERO 2 - NET 3 - MEMORY 4 - BATTERY

OPERATION	WEIGHT	U.PRICE	T.PRICE	1	2	3	4	REMARKS
	2.0 0 0	0.0 0	0.0 0					Weighing mode.
[M] [M]	P.S E t	0.0 0						Depress M key twice within 3 seconds (or press REZERO + 8 8 8) to enter into preset key setting mode.
[1] [2] [5]	P.S E t	1.2 5						Enter preset value.
[PRESET 1]	P.S E t	0.0 0						Store to PRESET KEY 1.
[2] [2] [5]	P.S E t	2.2 5						Enter preset value.
[C]	P.S E t	0.0 0						Clear preset value.
[PRESET 2]	P.S E t	0.0 0						Clear PRESET KEY 2.
[3] [0] [5]	P.S E t	3.0 5						Enter new preset value.
[PRESET 3]	P.S E t	0.0 0						Store to PRESET KEY 3.
[M]	0.0 0 0	0.0 0	0.0 0					Return to Weighing mode.
[PRESET 3]	2.0 0 0	3.0 5	6.1 0					Select PRESET 3.
[PRESET 1]	2.0 0 0	1.2 5	2.5 0					Select PRESET 1.
[PRESET 2]	2.0 0 0	0.0 0	0.0 0					Select PRESET 2.

3.10.2. Conversion Rate Setting (Available when SPEC 15.BIT0 = 0)

1 - ZERO 2 - NET 3 - MEMORY 4 - BATTERY

OPERATION	WEIGHT	U.PRICE	T.PRICE	1	2	3	4	REMARKS
	2.0 0 0	0.0 0	0.0 0					Weighing mode.
[M] [M]	P.S E t	0.0 0						Depress M key twice within 3 seconds (or press REZERO + 8 8 8) to enter into preset key setting mode.
[M]	E U R O	r A t E	0					Enter into conversion rate setting mode.
[2] [2] [0]	E U R O	r A t E	2. 2 0					Set conversion rate to 2.20.
[M]	2.0 0 0	0.0 0	0.0 0					Return to Weighing mode.

3.10.3. Invert Currency Conversion Function (When SPEC 15.BIT0=0 and SPEC 25.BIT1=0)

1 - ZERO 2 - NET 3 - MEMORY 4 - BATTERY

OPERATION	WEIGHT	U.PRICE	T.PRICE	1	2	3	4	REMARKS
	2.0 0 0	0.0 0	0.0 0					Weighing mode.
[M] [M]	P.S E t	0.0 0						Depress M key twice within 3 seconds (or press REZERO + 8 8 8) to enter into preset key setting mode.
[M]	E U R O	R A t E	0					Enter into conversion rate setting mode.
[RE-ZERO]	8 8 8 8 8	8 8 8 8 8	888888					Enter 2 0 0 1 while pressing RE-ZERO.
[RE-ZERO]+[2][0][0][1]		E U R O	InvErt					EURO conversion function is inverted.
[M]	2.0 0 0	0.0 0	0.0 0					Return to Weighing mode.

*Note: When Invert Currency Conversion Function operation is performed, following change will be made internally:

- 1) The data set in SPEC14.BIT1&0 and SPEC 26.BIT3&2 is exchanged.
- 2) Set SPEC 27.BIT2 = 0; SPEC 27.BIT1 = 0; SPEC 27.BIT1 = 1.

3.10.4. Cancel Currency Conversion Function (Available when SPEC 15.BIT0 = 0)

1 - ZERO 2 - NET 3 - MEMORY 4 - BATTERY

OPERATION	WEIGHT	U.PRICE	T.PRICE	1	2	3	4	5	REMARKS
	2.0 0 0	0.0 0	0.0 0						Weighing mode.
[M] [M]	P.S E t	0.0 0							Depress M key twice within 3 seconds (or press REZERO + 8 8 8) to enter into preset key setting mode.
[M]	E U R O	R A t E	0						Enter into conversion rate setting mode.
[RE-ZERO]	8 8 8 8 8	8 8 8 8 8	8 8 8 8 8 8						Enter 2 0 0 1 while pressing RE-ZERO.
[RE-ZERO]+[2][0][0][2]		E U R O	CAnCEL						EURO conversion function is cancelled.
[M]	2.0 0 0	0.0 0	0.0 0						Return to Weighing mode.

*Note: When Cancel Currency Conversion Function operation is performed, SPEC 21.BIT3 is set to 1 internally.

4. Error Message

The following error message will appear when an incorrect operation is performed.

Message	Reason	Solution
O F	When displayed weight exceeded capacity +9d, or something is on the platter when power on	Remove the item on the platter
U F	When displayed weight $\leq -9d$	REZERO or ON/OFF again
E r r o r	When calibration operation is not correct, or A/D fault. Or an error occurred in RS-232C communication	Repeat calibration operation Reset RS-232 communication
8 8 8 8 8	When scale is not steady after powered on	Place scale on firm and flat base
TotAl FULL	When current Total overflow	Clear current Total

Note: If you cannot remove the trouble on this scale please call our service man.

5. Hardware Detail

5.1. Microcomputer

Hitachi HD6473644 (8 Bit, 32K PROM) / HD6433644 (8 Bit, 32K ROM) / HD6433643 (8 Bit, 24K ROM) / HD6433642 (8 Bit, 16K ROM) Microcomputer was chosen for the following reasons:

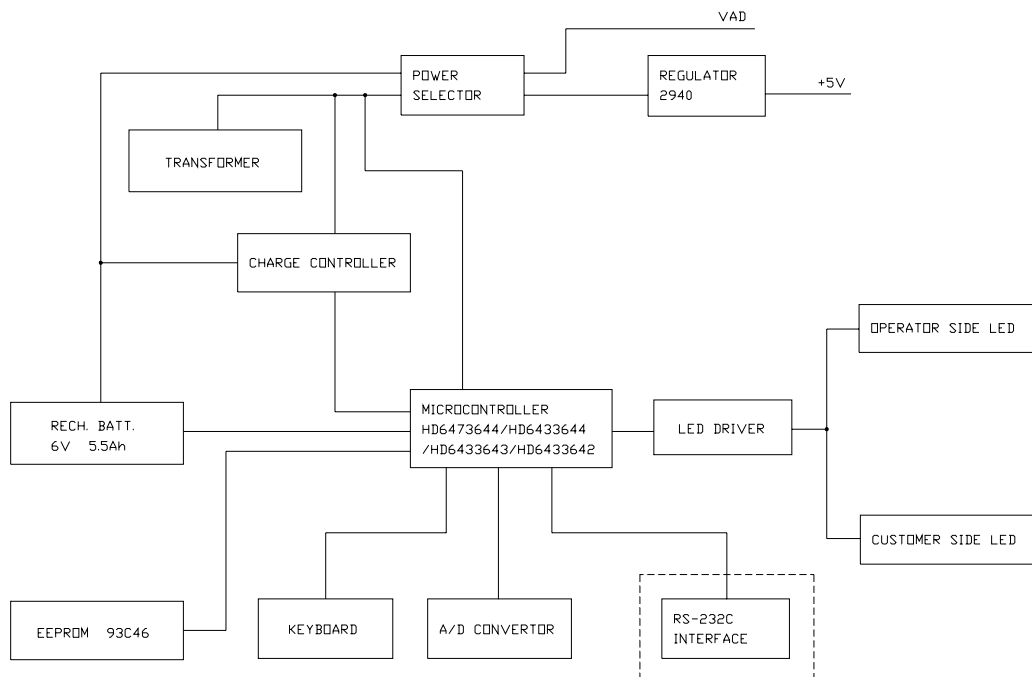
- * Cheaper.
- * High-speed CPU with sixteen 8-bit registers.
- * Having an on-chip programmable FIP controller/driver.
- * 33 interrupt sources and efficient interrupt processing.
- * Five versatile timers.
- * Two on-chip serial communication interface channels and 8-channel A/D converter.
- * Less chip count.
- * Pin compatibility of similar package with difference ROM sizes.
- * Good support.

5.2. Pin Assignment

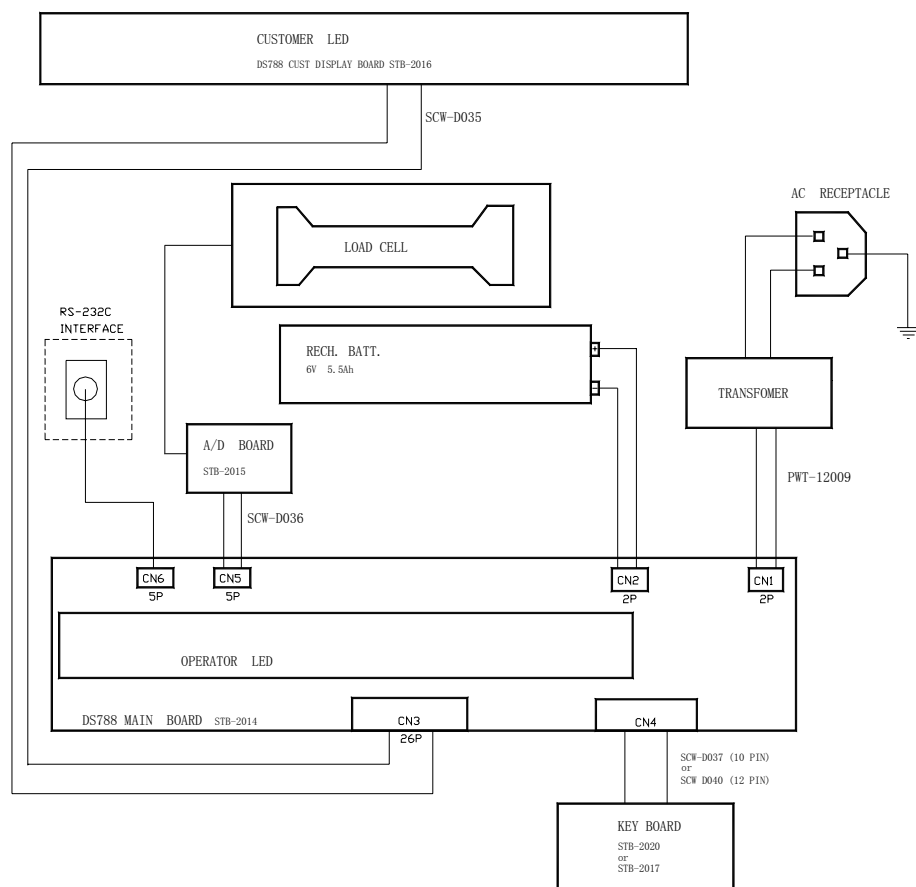
Pin	I/O	Assignment	Device	Remark
P10/TMOW	O	CS	93LC46	EEPROM
P14/PWM	O	A	UPA2003	LED Driver
P15/IRQ1	O	B	UPA2003	LED Driver
P16/IRQ2	O	C	UPA2003	LED Driver
P17/IRQ3/TRGV	O	D	UPA2003	LED Driver
P20/SCK3	O	RTS	MAX232	RS-232C
P21/RXD	I	RXD	MAX232	RS-232C
P22/TXD	O	TXD	MAX232	RS-232C
P30/SCK1	O	SK	93LC46	EEPROM
P31/SI1	I	DI	93LC46	EEPROM
P32/SO1	O	DO	93LC46	EEPROM
P50/INT0	O	TP1	UPA2003	LED Driver
P51/INT1	O	TP2	UPA2003	LED Driver
P52/INT2	O	TP3	UPA2003	LED Driver
P53/INT3	O	TP4	UPA2003	LED Driver
P54/INT4	O	TP5	UPA2003	LED Driver
P55/INT5/ADTRG	O	TP6	UPA2003	LED Driver
P56/INT6/TMIB	O	UP1	UPA2003	LED Driver
P57/INT7	O	UP2	UPA2003	LED Driver
P60	O	UP3	UPA2003	LED Driver
P61	O	UP4	UPA2003	LED Driver
P62	O	UP5	UPA2003	LED Driver
P63	O	WT1	UPA2003	LED Driver
P64	O	WT2	UPA2003	LED Driver
P65	O	WT3	UPA2003	LED Driver
P66	O	WT4	UPA2003	LED Driver
P67	O	WT5	UPA2003	LED Driver
P73	O	E	UPA2003	LED Driver
P74/TMRIV	O	F	UPA2003	LED Driver
P75/TMCIV	O	G	UPA2003	LED Driver
P76/TMOV	O	DP	UPA2003	LED Driver
P77	O	CUR	UPA2003	LED Driver

Pin	I/O	Assignment	Device	Remark
Pin	I/O	Assignment	Device	Remark
P80/FTCI	O	CBUZZ	Buzzer	Buzzer Sounder
P81/FTOA	O	ADS1	4051	Controls A/D Conversion
P82/FTOB	O	ADS2	4051	Controls A/D Conversion
P83/FTIA	I	ADINT	LMC6032	A/D Conversion Interrupt
P84/FTIB	O	BTPW	BATT-PW	Controls BATT Power
P85/FTIC	O	TBT	BATT-DETECTOR	Controls BATT Detector
P86/FTID	O	BTCHG	BATT-CHARGER	Controls BATT Charger
P87	O	T6	Keyboard	Key Scanning Line
P90/FVPP	O	T1	Keyboard	Key Scanning Line
P91	O	T2	Keyboard	Key Scanning Line
P92	O	T3	Keyboard	Key Scanning Line
P93	O	T4	Keyboard	Key Scanning Line
P94	O	T5	Keyboard	Key Scanning Line
PB0/AN0	I	BTV	Battery	Detects Battery Voltage
PB1/AN1	I	ACIN	AC Power	Detects AC Power
PB2/AN2	I	CTS	MAX232	RS-232C
PB3/AN3	I	K0	Keyboard	Key Return Line
PB4/AN4	I	K1	Keyboard	Key Return Line
PB5/AN5	I	K2	Keyboard	Key Return Line
PB6/AN6	I	K3	Keyboard	Key Return Line
PB7/AN7	I	K4	Keyboard	Key Return Line
IRQ0	I	-	-	-
OSC1	I	-	Oscillator	10 MHz Crystal
OSC2	O	-	Oscillator	10 MHz Crystal
X1	I	-	-	Connected to VCC Pin
X2	O	-	-	-
AVCC	-	-	-	Analog power supply
AVSS	-	-	-	Analog ground
VCC	-	-	-	Power supply
VSS	-	-	-	Ground
TEST	I	-	-	-
RES	I	-	Reset device	System Reset

5.3. Block Diagram of Electrical Connection



5.4. Physical layout of Electrical Connection

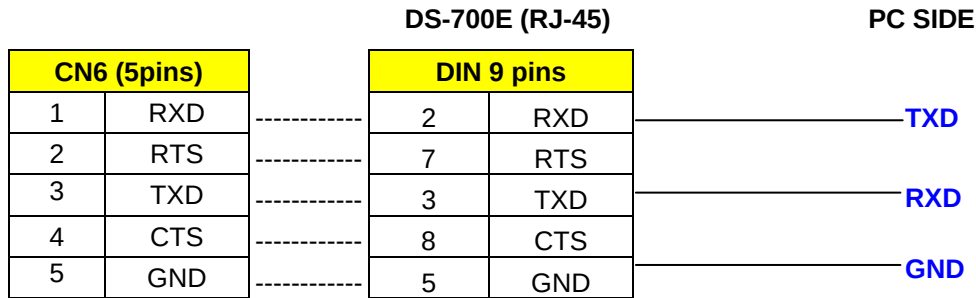


6. RS-232C Interface (Normal)

6.1. Specification

Baud Rate : 1200 / 2400 / 4800 / 9600 / 19200 bps.
 Start Bit : 1 Bit.
 Stop Bit : 1 / 2 Bit.
 Data Bit : 7 / 8 Bits.
 Parity Bit : Even / Odd / None.

6.2. Pin Connection



Note: RTS/CTS handshaking function is effective only when SPEC3.3 = 0.

6.3. Control Code and Characters

Data Type	Contents	Function	HEX Code
Termination Code	CR	The end of data	0x0d
	LF	The end of Text	0x0a
Data	0 – 9	Numeric data	0x30 – 0x39
	- (Minus)	Minus sign	0x2d
	. (Decimal)	Decimal	0x2e
	Space	Data error or empty	0x20
	OF	Overflow	0x4f 0x46
	UF	Underflow	0x55 0x46
Header Code	0	Net Weight	0x30
	4	Tare Weight	0x34
	U	Unit Price	0x55
	T	Total Price	0x54
Command	ENQ	Enquiry	0x05
	ACK	Acknowledged	0x06
	NAK	Unacknowledged	0x15

6.4. Data Format

A) Without additional parity (Total 37 Bytes)

Status Flag	Weight Condition Flag	CR	Header Code	Net Weight	CR	Header Code	Tare Weight
1 Byte	1 Byte	1 Byte	1 Byte	6 Bytes	1 Byte	1 Byte	6 Bytes



CR	Header Code	Unit Price	CR	Header Code	Total Price	CR	LF
1 Byte	1 Byte	6 Bytes	1 Byte	1 Byte	7 Bytes	1 Byte	1 Byte

B) With additional parity (Total 38 Bytes)

Status Flag	Weight Condition Flag	CR	Header Code	Net Weight	CR	Header Code	Tare Weight
1 Byte	1 Byte	1 Byte	1 Byte	6 Bytes	1 Byte	1 Byte	6 Bytes



CR	Header Code	Unit Price	CR	Header Code	Total Price	CR	Additional Parity	LF
1 Byte	1 Byte	6 Bytes	1 Byte	1 Byte	7 Bytes	1 Byte	1 Byte	1 Byte

*Note: If the additional parity is 0DH, 0AH or 00H, it will be changed to 1DH, 1AH or 10H respectively.

● Status Flag:

Not Used	Fixed to 1	Not used	Price Base	Price Base	Total Price Overflow	Net	Additional Parity
----------	------------	----------	------------	------------	----------------------	-----	-------------------

Bit 7 : Not used. Always 0;

Bit 6 : Fixed to 1.

Bit 5 : Not used.

Bit 4 and Bit 3: Price Base. 00 - \$/kg, 01 - \$/100g, 10 - \$/1b, 11 - \$/1/41b.

Bit 2 : Total Price Overflow. Set to 1 when total price overflow, 0 when not.

Bit 1 : Net. Set to 1 When tare subtraction is performed, 0 when not.

Bit 0 : Additional parity flag. Set to 1 when additional parity code is added in text, 0 when not.

● Weight Condition Flag:

Not used	Fixed to 1	Not used	Weight UF	Weight OF	Negative Net Weight	Weight Stable	Zero Sign
----------	------------	----------	-----------	-----------	---------------------	---------------	-----------

Bit 7: Not used. --- Always set 0.

Bit 6: Fixed to 1.

Bit 5: Not used.

Bit 4: Weight UF. Set to 1 when weight underflow, 0 when not.

Bit 3: Weight OF. Set to 1 when weight overflow, 0 when not.

Bit 2: Negative Net Weight. Set to 1 when net weight is negative, 0 when not.

Bit 1: Weight Stable. Set to 1 when weight is stable. 0 when not.

Bit 0: Zero Sign. Set to 1 when weight zero sign is set. 0 when not.

- Example1: Transmit all data.

Net weight = 3.456 Tare weight = 1.200 Unit Price = 1.500 (\$/kg)

Total Price = 5.184 Weight status: stable

Status Flag: 42H

0	1	0	0	0	0	1	0
---	---	---	---	---	---	---	---

Weight Condition Flag: 42H

0	1	0	0	0	0	1	0
---	---	---	---	---	---	---	---

By ASCII Code:

42H	42H	0DH	30H	30H	33H	2EH	34H	35H	36H	0DH
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

34H	30H	31H	2EH	32H	30H	30H	0DH
-----	-----	-----	-----	-----	-----	-----	-----

55H	30H	31H	2EH	35H	30H	30H	0DH
-----	-----	-----	-----	-----	-----	-----	-----

54H	30H	30H	35H	2EH	31H	38H	34H	0DH	0AH
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

- Example2: Only transmit Net weight and Total Price.

42H	42H	0DH	30H	30H	33H	2EH	34H	35H	36H	0DH
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

54H	30H	30H	35H	2EH	31H	38H	34H	0DH	0AH
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

- Example3: When weight is overflow, the following data is output.

42H	48H	0DH	30H	20H	20H	20H	20H	4FH	46H	0DH
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

34H	30H	31H	2EH	32H	30H	30H	0DH
-----	-----	-----	-----	-----	-----	-----	-----

55H	30H	31H	2EH	35H	30H	30H	0DH
-----	-----	-----	-----	-----	-----	-----	-----

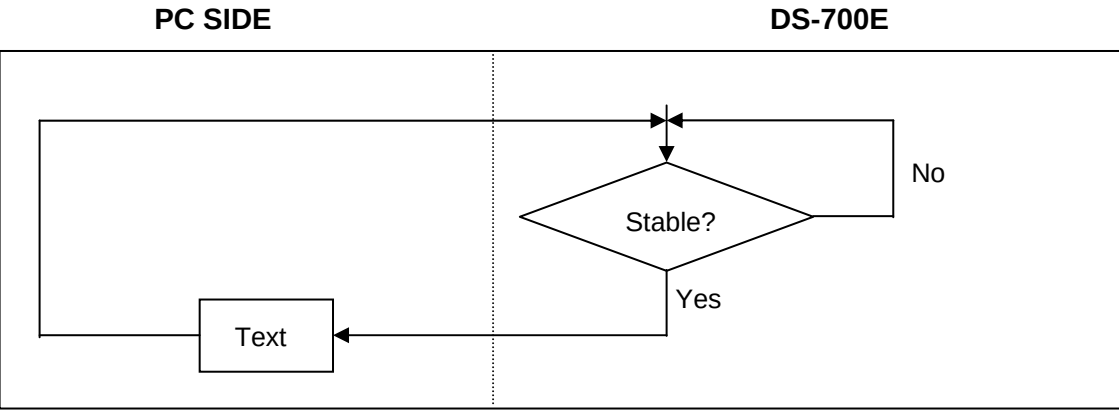
54H	20H	20H	20H	20H	20H	20H	20H	0DH	0AH
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

6.5. Communication Method

The data communication method can be selected as Stream (continuous), Manual, and Command by specification settings.

6.5.1. Stream (Continuously Output)

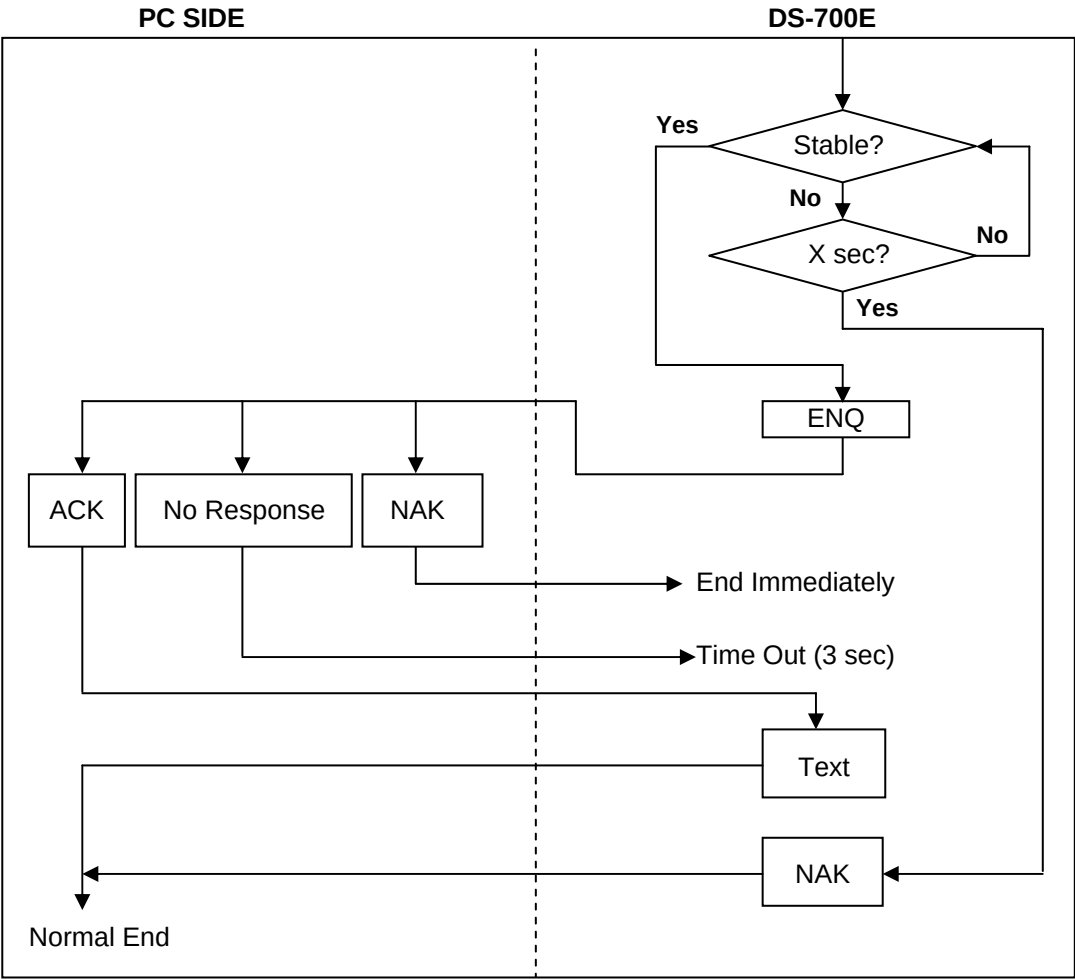
Data is transmitted to PC side continuously.



Note: Weight stable check depends on SPEC setting.

6.5.2. Manual

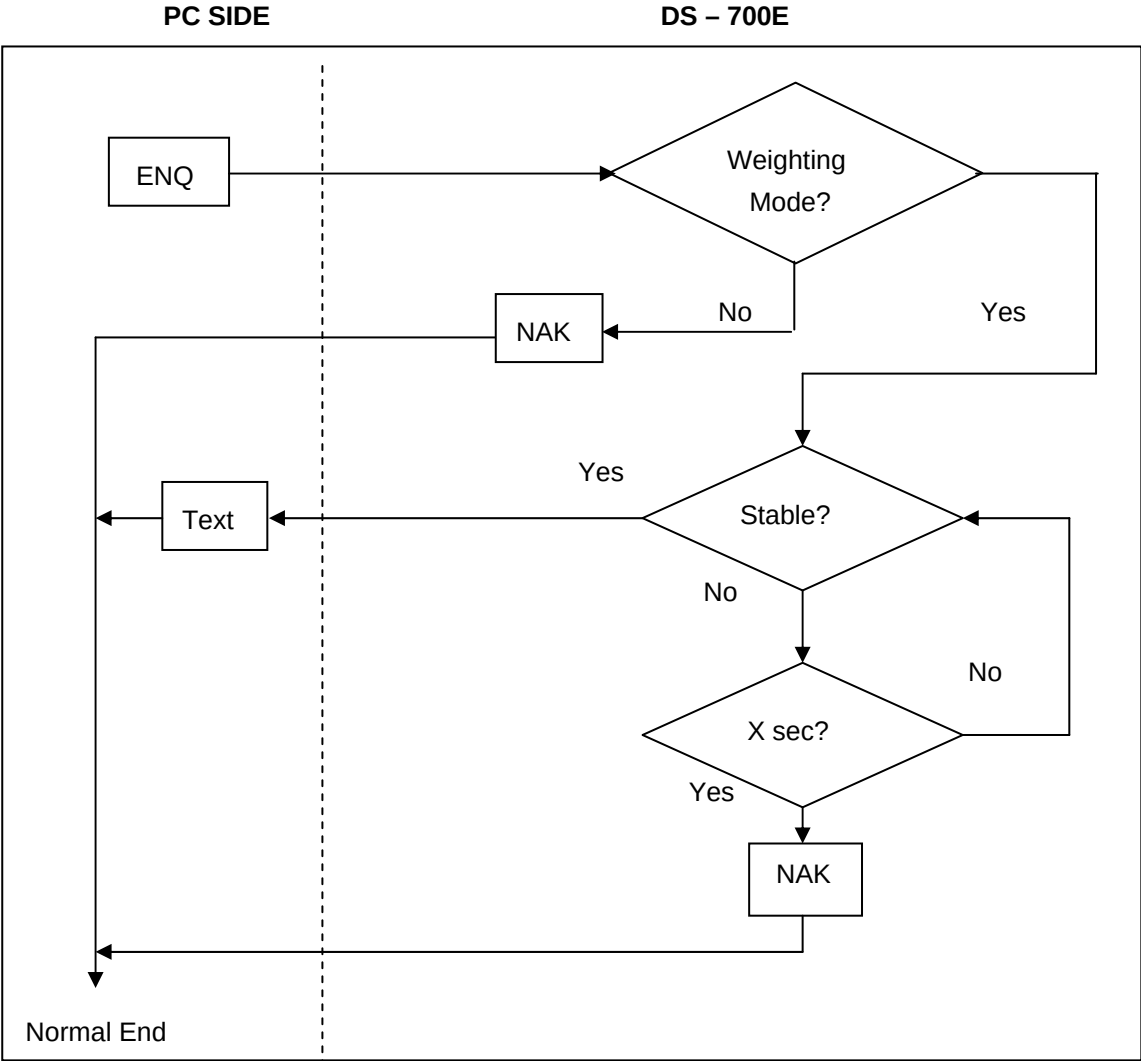
Data is output once Manual key (+ key) pressed. User may select to transmit the data right away or hold the command until weight become stable by specification setting.



Note: Weight stable check depends on SPEC setting.

6.5.3. Command

The data transmission starts by receiving the command from external (Ex. PC side).



*Note: Weight stable check depends on SPEC setting.

7. RS-232C Additional Protocol for ECR

7.1. Control Code and Characters

Command & Item	HEX Code
SOH	0x01
STX	0x02
ETX	0x03
EOT	0x04
CR	0x0d
LF	0x0a
RS	0x1e
ENQ	0x05
NAK	0x15
NULL	0x00
DC1	0x11
DC2	0x12
CAN	0x18

7.2. Communication With ECR

7.2.1. QUQA TRADING

ECR Request:

- DC1: Output the data in transmission format 1.
- DC2: Output the data in transmission format 2.

Data Strings Format:

- Format1:

SOH	STX	STA	SIGN	W5	W4	W3	W2	W1	W0	UN1	UN2	BCC	ETX	EOT
-----	-----	-----	------	----	----	----	----	----	----	-----	-----	-----	-----	-----

- Format2:

SOH	STX	P7	P6	P5	P4	P3	P2	P1	P0	BCC	ETX
-----	-----	----	----	----	----	----	----	----	----	-----	-----

STX	STA	SIGN	W5	W4	W3	W2	W1	W0	UN1	UN2	BCC	ETX
-----	-----	------	----	----	----	----	----	----	-----	-----	-----	-----

STX	U7	U6	U5	U4	U3	U2	U1	U0	BCC	ETX	EOT
-----	----	----	----	----	----	----	----	----	-----	-----	-----

STA: 'S'(0x53) when stable, 'U'(0x55) when unstable.

SIGN: ' '(0x20) when positive and zero, '-'(0x2d) when negative.

UN1: ' '(0x20) when g, 'k'(0x6b) when kg, 'l'(0x6c) when lb.

UN2: 'g'(0x67) when g, 'g'(0x67) when kg, 'b'(0x62) when lb.

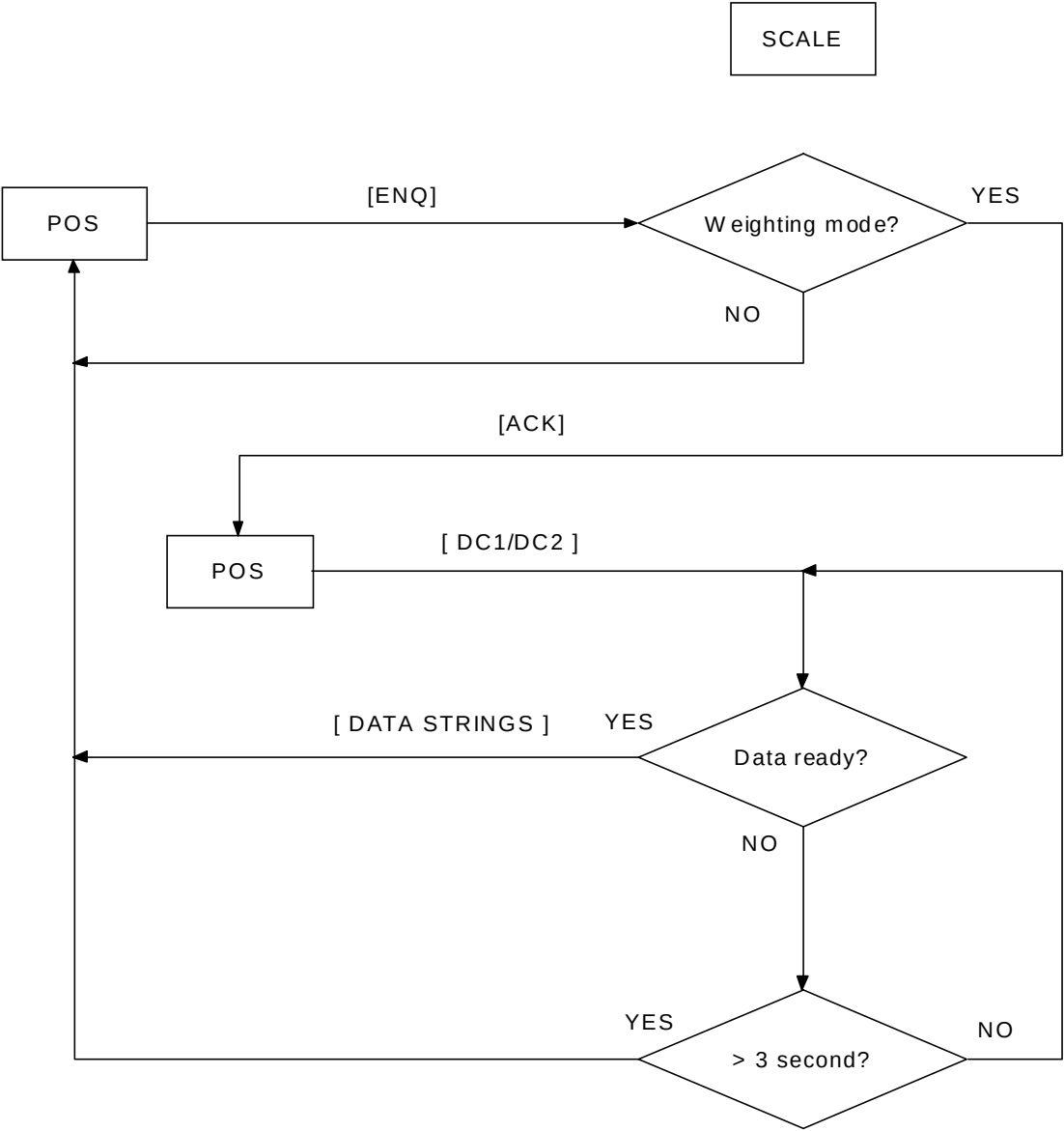
BCC: Data block exclusive value.

W5 – W0: Weight data with decimal point '.'(0x2e), when under flow or overflow all 'F'(0x46).

P7 – P0: Total price data with decimal point '.'(0x2e), when overflow all 'F'(0x46).

U7 – U0: Unit price data with decimal point '.'(0x2e).

Data Flow:



7.2.2. IBM, HUGIN interface

Data Strings Format:

W5	W4	W3	W2	W1	RS
----	----	----	----	----	----

W5 ~ W1 : Weight data (transmitted with ASCII code).

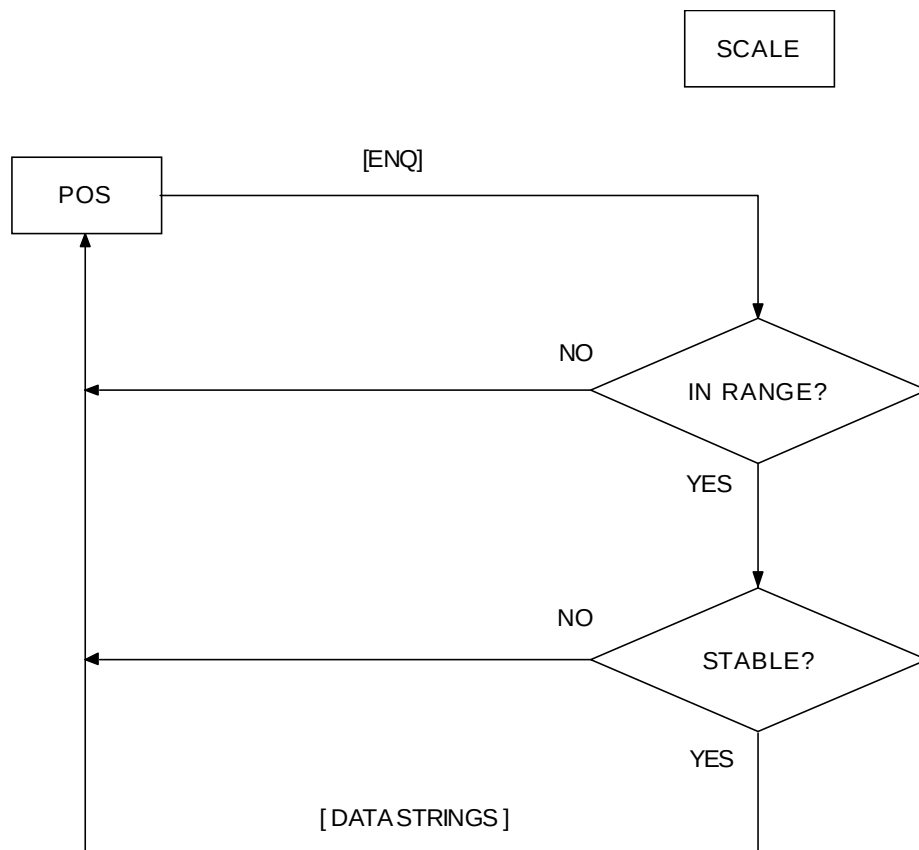
W5 : Tens of lbs or kgs.

W4 : Units of lbs or kgs.

W3 : Tenth of lbs or kgs.

W2 : Hundredth of lbs or kgs.

W1 : Thousandths of lbs or kgs.



7.2.3 ICL interface

Data Strings Format:

STX	ID	W5	W4	W3	W2	W1	BCC	ETX
-----	----	----	----	----	----	----	-----	-----

ID [Identification Bytes]

CODE THAT SHOWS CAPACITY OF SCALE AND MINIMUM DISPLAY.

Capacity	Minimum Display	Figure Of Each Bit Of ID
		6543210
15kg	5g	11?1001
30LB	0.01LB	11?1010

Note: BIT 4 is always 0 for ACTUAL (OMRON) AND PORTUGAL.

In OLD (OMRON), BIT4 becomes 1 unless weight data exceeds the digits of display or if

It does not exceed PRINTING OUT OF RANGE.

In this case, weight data is transmitted all with '0'(0x30).

W5 ~ W1: Weight data (transmitted with ASCII code).

W5 : Tens of lbs or kgs.

W4 : Units of lbs or kgs.

W3 : Tenth of lbs or kgs.

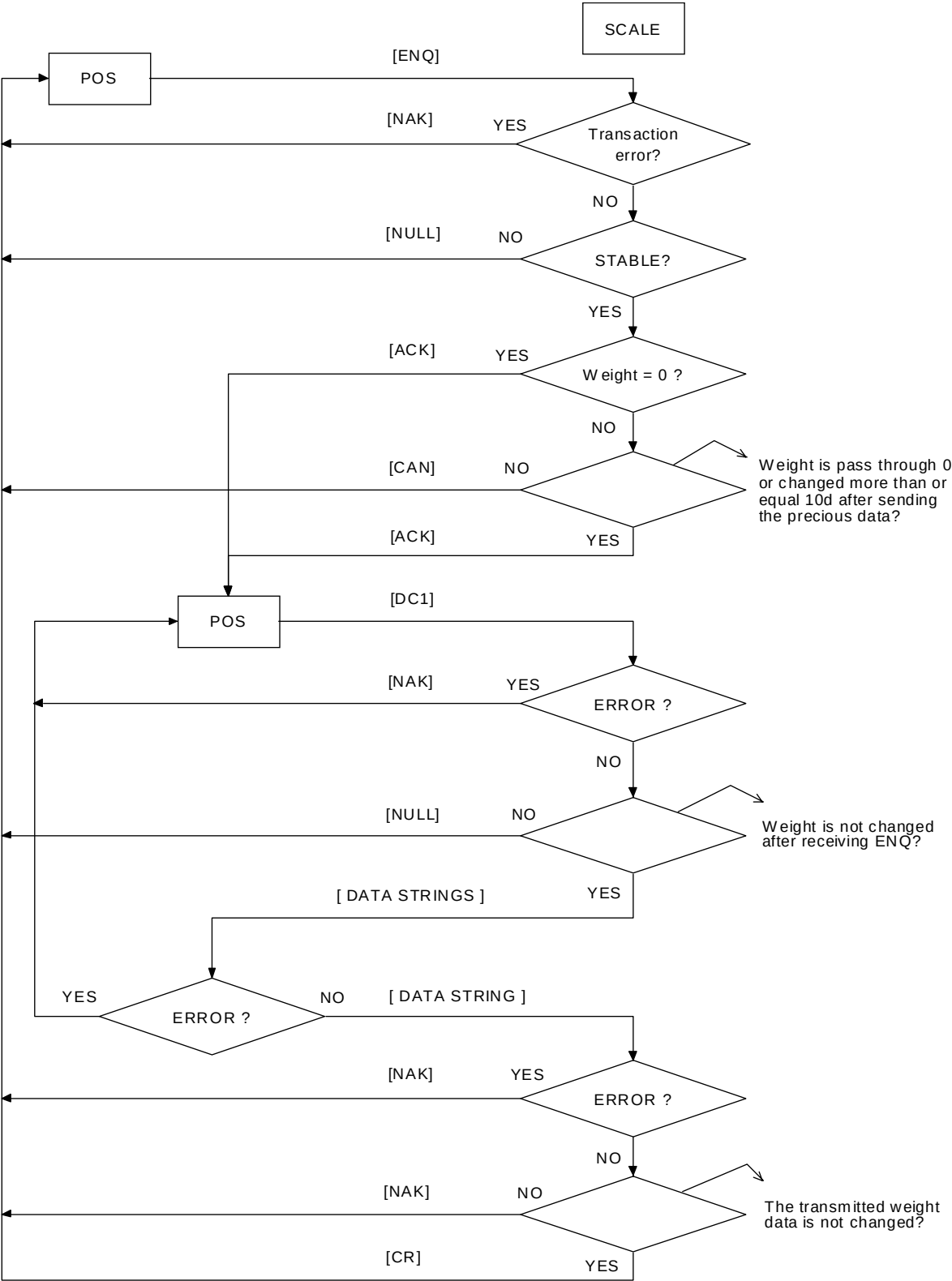
W2 : Hundredth of lbs or kgs.

W1 : Thousandths of lbs or kgs.

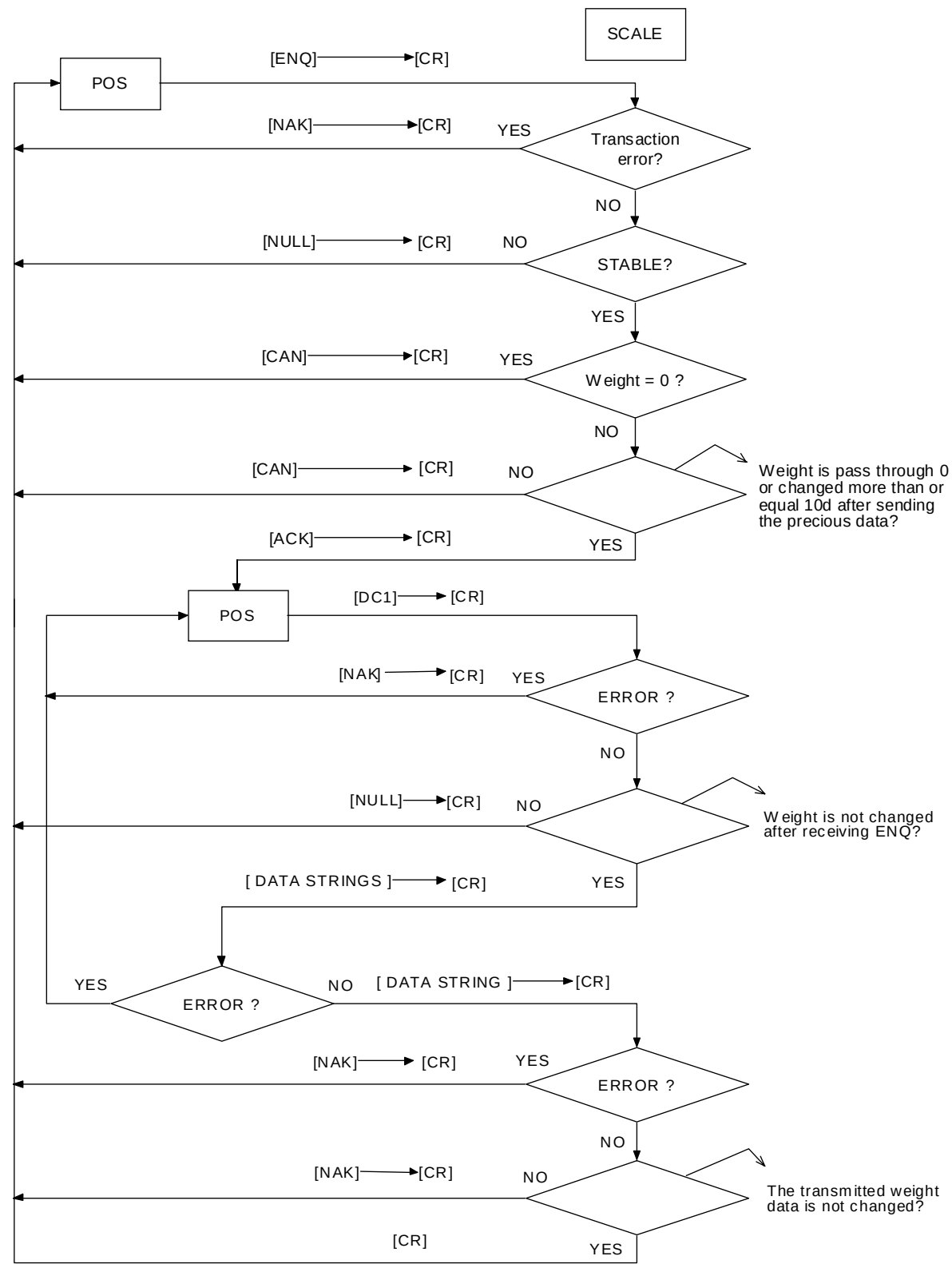
Even if the highest digit is 0, it is transmitted as '0'(0x30).

BCC [Block Check Character]: Exclusive OR value of all data except STX and ETX.

7.2.3.1 ICL (OLD, OLD OMRON)



7.2.3.2. ICL (PORTUGAL)



7.2.4. CAS interface

ECR Request:

'DC1': Output the data in transmission format 1.

'DC2': Output the data in transmission format 2.

Data Strings Format:

Format1:

SOH	STX	STA	SIGN	W4	W3	DP	W2	W1	W0	k	g	BCC	ETX	EOT
-----	-----	-----	------	----	----	----	----	----	----	---	---	-----	-----	-----

Format2:

SOH	STX	P6	P5	P4	P3	P2	DP	P1	P0	BCC	ETX
-----	-----	----	----	----	----	----	----	----	----	-----	-----

STX	STA	SIGN	W4	W3	DP	W2	W1	W0	k	g	BCC	ETX
-----	-----	------	----	----	----	----	----	----	---	---	-----	-----

STX	U6	U5	U4	U3	U2	DP	U1	U0	BCC	ETX	EOT
-----	----	----	----	----	----	----	----	----	-----	-----	-----

STA: 'S'(0x53) when weight is stable, 'U'(0x55) when weight is unstable.

SIGN: ' '(0x20) when zero or positive weight, '-'(0x2d) when negative, 'F'(0x46) when overflow.

DP: '.'(0x2e) decimal point.

k: 'k'(0x6b).

g: 'g'(0x67).

W4 ~ W0: Weight data.

P6 ~ P0: Price data.

U6 ~ U0: Unit Price data.

BCC: Created by XOR (exclusive or) of data block.

SAMPLES:

1) Plate empty, no UNIT PRICE, no PRICE:

a) after DC1

SOH STX STA SIGN W4 W3 KD W2 W1 W0 k g BCC ETX EOT
 01 02 53 20 20 30 2e 30 30 30 6b 67 71 03 04

b) after DC2

SOH STX P6 P5 P4 P3 P2 KD P1 P0 BCC ETX STX STA SIGN W4 W3 KD
W2 W1 W0 k g BCC ETX STX U6 U5 U4 U3 U2 KD U1 U0 BCC ETX EOT
 01 02 20 20 20 20 30 2e 30 30 1e 03 02 53 20 20 30 2e
 30 30 30 6b 67 71 03 02 20 20 20 20 30 2e 30 30 1e 03 04

2) 380g on plate, no UNIT PRICE, no PRICE:

a) After DC1

SOH STX STA SIGN W4 W3 KD W2 W1 W0 k g BCC ETX EOT
 01 02 53 2d 20 30 2e 33 38 30 6b 67 7a 03 04

b) After DC2

SOH STX P6 P5 P4 P3 P2 KD P1 P0 BCC ETX STX STA SIGN W4 W3 KD
W2 W1 W0 k g BCC ETX STX U6 U5 U4 U3 U2 KD U1 U0 BCC ETX EOT
 01 02 20 20 20 20 30 2e 30 30 1e 03 02 53 20 20 30 2e
 33 38 30 6b 67 7a 03 02 20 20 20 20 30 2e 30 30 1e 03 04

3) 1000g on plate, UNIT PRICE is 1.00 , PRICE is 1.00 :

a) after DC1

SOH STX STA SIGN W4 W3 KD W2 W1 W0 k g BCC ETX EOT
 01 02 53 20 20 31 2e 30 30 30 6b 67 70 03 04

b) after DC2

SOH STX P6 P5 P4 P3 P2 KD P1 P0 BCC ETX STX STA SIGN W4 W3 KD
W2 W1 W0 k g BCC ETX STX U6 U5 U4 U3 U2 KD U1 U0 BCC ETX EOT
 01 02 20 20 20 20 31 2e 30 30 1f 03 02 53 20 20 30 2e
 30 30 30 6b 67 70 03 02 20 20 20 20 31 2e 30 30 1f 03 04

4) Weight not stable, UNIT PRICE is 1.00 , PRICE is ????????:

a) after DC1

SOH STX STA SIGN W4 W3 KD W2 W1 W0 k g BCC ETX EOT
 01 02 55 20 20 31 2e 39 33 35 6b 67 79 03 04

b) after DC2

SOH STX P6 P5 P4 P3 P2 KD P1 P0 BCC ETX STX STA SIGN W4 W3 KD
W2 W1 W0 k g BCC ETX STX U6 U5 U4 U3 U2 KD U1 U0 BCC ETX EOT
 01 02 20 20 20 20 31 2e 39 35 13 03 02 55 20 20 31 2e
 39 34 35 6b 67 7e 03 02 20 20 20 20 31 2e 30 30 1f 03 04

5) -50g on plate, no UNIT PRICE, no PRICE:

a) after DC1

SOH STX STA SIGN W4 W3 KD W2 W1 W0 k g BCC ETX EOT
 01 02 53 2d 20 30 2e 30 35 30 6b 67 79 03 04

b) after DC2

SOH STX P6 P5 P4 P3 P2 KD P1 P0 BCC ETX STX STA SIGN W4 W3 KD
W2 W1 W0 k g BCC ETX STX U6 U5 U4 U3 U2 KD U1 U0 BCC ETX EOT
 01 02 20 20 20 20 30 2e 30 30 1e 03 02 53 2d 20 30 2e
 30 35 30 6b 67 79 03 02 20 20 20 20 30 2e 30 30 1e 03 04

6) 1540g on plate, UNIT PRICE is 9999.99 , no PRICE because of OVER LOAD:

a) after DC1

SOH STX STA SIGN W4 W3 KD W2 W1 W0 k g BCC ETX EOT
 01 02 53 20 20 31 2e 35 34 30 6b 67 71 03 04

b) after DC2

SOH STX P6 P5 P4 P3 P2 KD P1 P0 BCC ETX STX STA SIGN W4 W3 KD
W2 W1 W0 k g BCC ETX STX U6 U5 U4 U3 U2 KD U1 U0 BCC ETX EOT
 01 02 20 20 20 20 30 2e 30 30 1e 03 02 53 20 20 31 2e
 35 34 30 6b 67 71 03 02 20 39 39 39 39 2e 39 39 e 03 04

7) More than 15kg on plate, UNIT PRICE (999.99) and PRICE are not displayed:

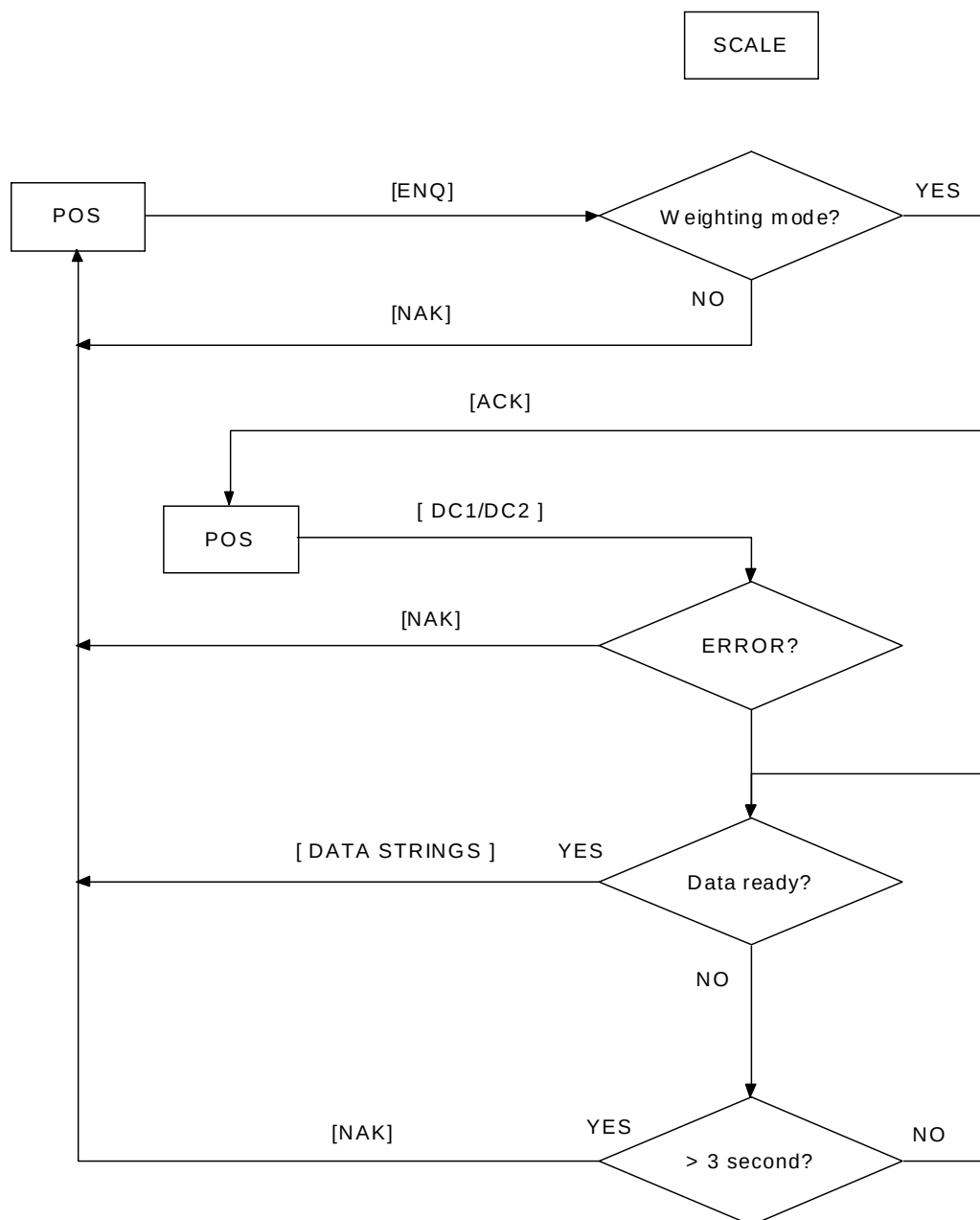
a) after DC1

SOH STX STA SIGN W4 W3 KD W2 W1 W0 k g BCC ETX EOT
 01 02 55 46 46 46 46 46 46 46 6b 67 1f 03 04

b) after DC2

SOH	STX	P6	P5	P4	P3	P2	<u>KD</u>	P1	P0	BCC	ETX	STX	<u>STA</u>	<u>SIGN</u>	W4	W3	<u>KD</u>	
W2	W1	W0	k	g	BCC	ETX	STX	U6	U5	U4	U3	U2	<u>KD</u>	U1	U0	BCC	ETX	EOT
01	02	46	46	46	46	46	46	46	46	00	03	02	55	46	46	46	46	
46	46	46	6b	67	1f	03	02	20	20	39	39	39	2e	39	39	17	03	04

- Note:** 1. Can't communication When the Price Base is \$/lb or \$/1/4lb.
 2. Can't communication when the Decimal point position on weight display is 2nd digit.
 3. The unit and total price round when the Decimal point position on unit and total price display is 4th digit.



7.2.5 NIXDORF interface

ECR Request:

STX	W	ETX
-----	---	-----

W: uppercase 'W' (0x57).

Data Strings Format:

STX	w	VVV,VVV	kg or lb	FFFFFFFFFFFF	BCC	ETX
-----	---	---------	----------	--------------	-----	-----

w : Lowercase 'w'(0x77).

VVV,VVV : Weight data (ASCII CODE) with Comma point ','(0x2c)

kg or lb : Is switched according to the weight unit setting.

FFFFFFFFFFFF: Twelve error flags. If error flag stands, F on that area is set to '1'(0x31).

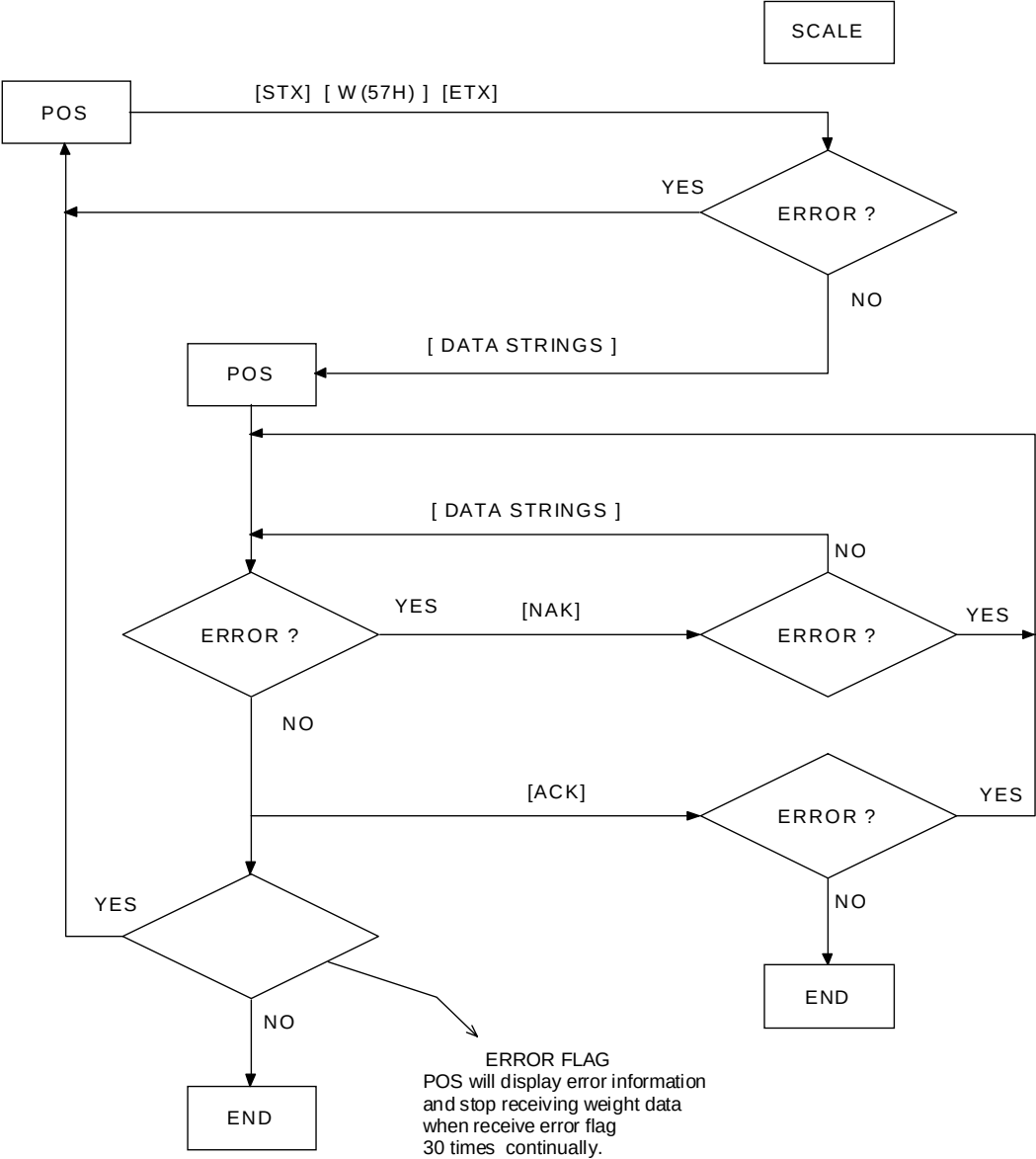
And all the other area is set to '0'(0x30).

BCC : Exclusive OR value of all data except STX and ETX.

Error flag description

- 1 : Stabilizing.
- 2 : Zero.
- 3 : Bellow zero.
- 4 : Tare active (not used).
- 5 : Under mini weight.
- 6 : Over weight range.
- 7 : PROM error (not used).
- 8 : Calibration error (not used).
- 9 ~ 12 : Reserved.

Note: The weight data rounds when Decimal point position on weight display is 2nd digit.



7.2.6 NCR interface

ECR Request :

W	CR
---	----

W : Uppercase 'W'(0x57).

Data Strings Format:

LF	VVVVVV	KG or LB	CR	LF	S	Stat1	Stat2	CR	ETX
----	--------	----------	----	----	---	-------	-------	----	-----

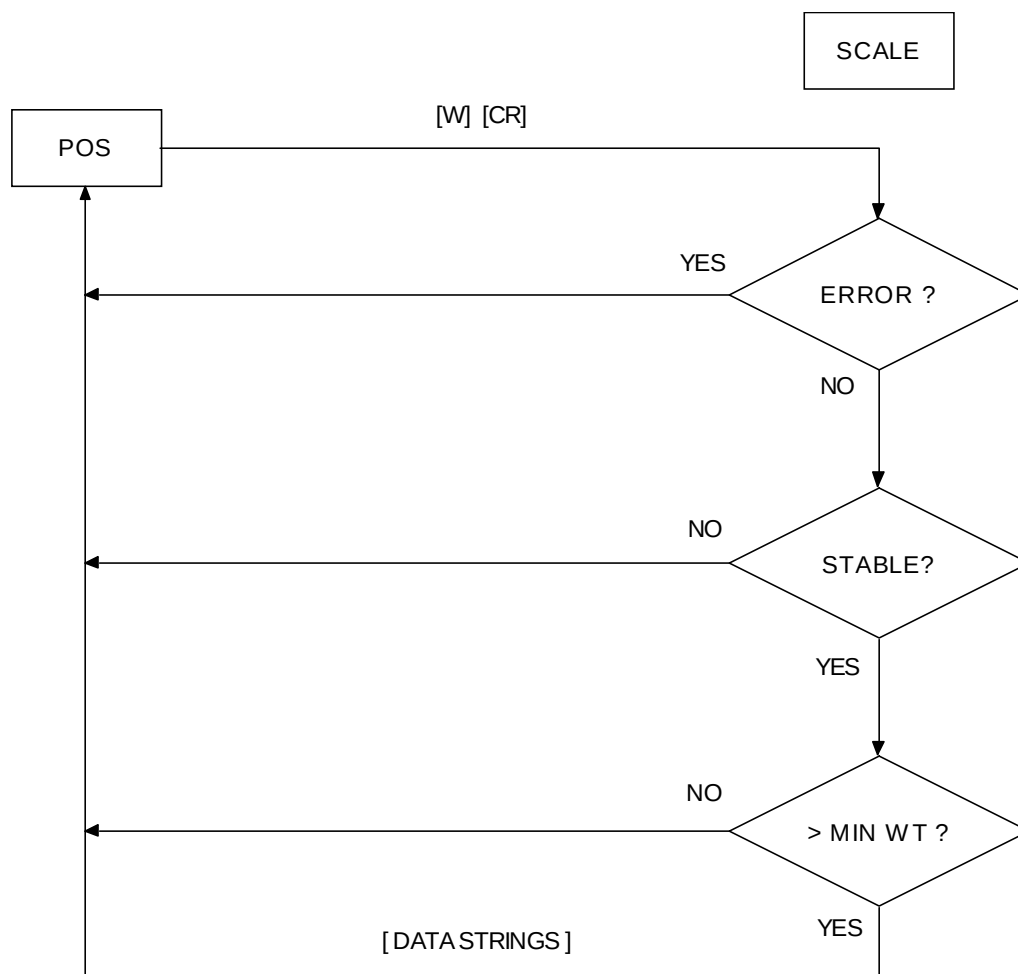
VVVVVV : Weight data (ASCII code)

KG : 'K'(0x4b), 'G'(0x47).

LB : 'L'(0x4c), 'B'(0x42).

Stat1 and Stat2 : NOT USED FOR ERROR CODE (ALWAYS 00).

Note: The data string is not sent when net weight is less than 0.



7.2.7 MONS interface

ECR Request:

(ENQ → DC1)

ENQ: Check the scale status and await ACK return.

DC1: Weight data request.

Data Strings Format:

SOH	STX	STATUS	SIGN	WW.WWW	UW1	UW2	BCC	ETX	EOT
-----	-----	--------	------	--------	-----	-----	-----	-----	-----

STATUS : 'S' (0x53).

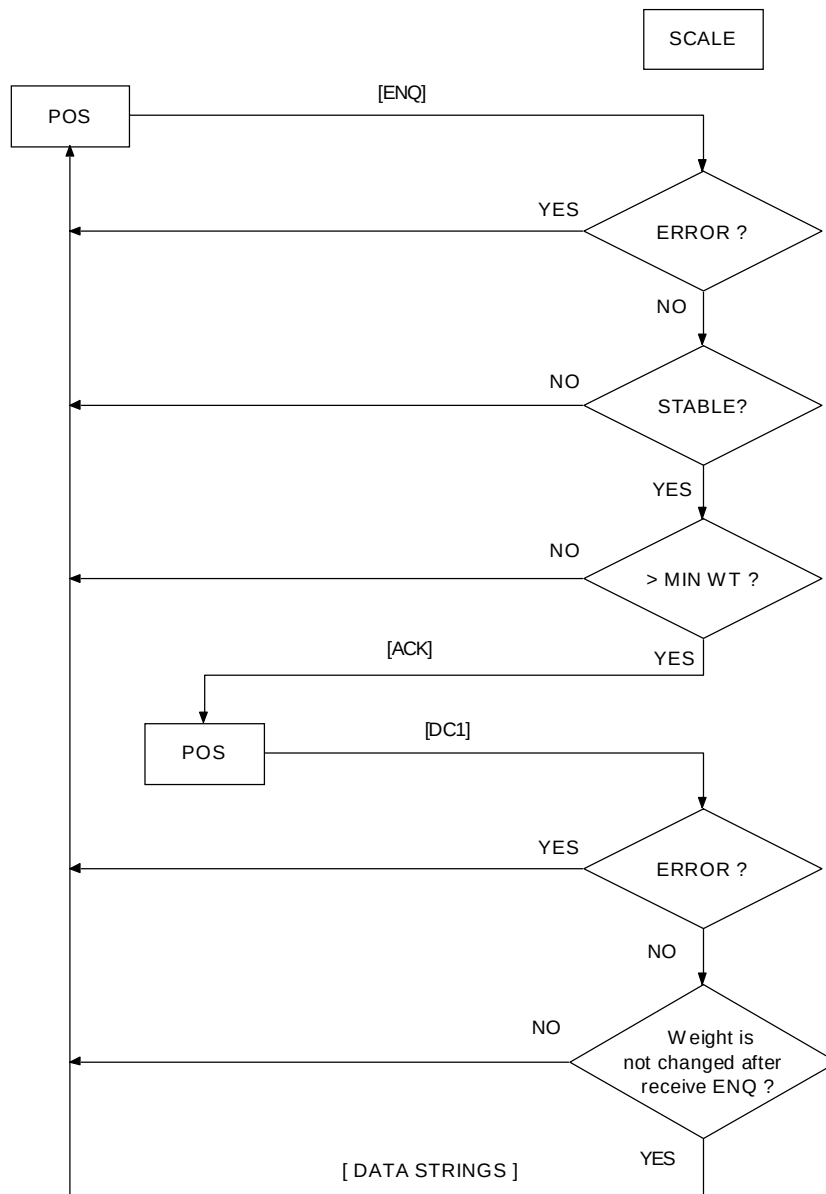
SIGN : ' '(0x20).

UW1 : 'k'(0x6b).

UW2 : 'g'(0x67).

BCC : Not used (Fixed at 0).

WW.WWW : Weight data with decimal.



7.2.8 WTN interface

Data Strings Format:

Data strings (11 x ASCII characters) for weight after pressing the KEY* at the scale keyboard.

W6	W5	W4	DP	W3	W2	W1	0x6b	0x67	0x0d	0x0a
----	----	----	----	----	----	----	------	------	------	------

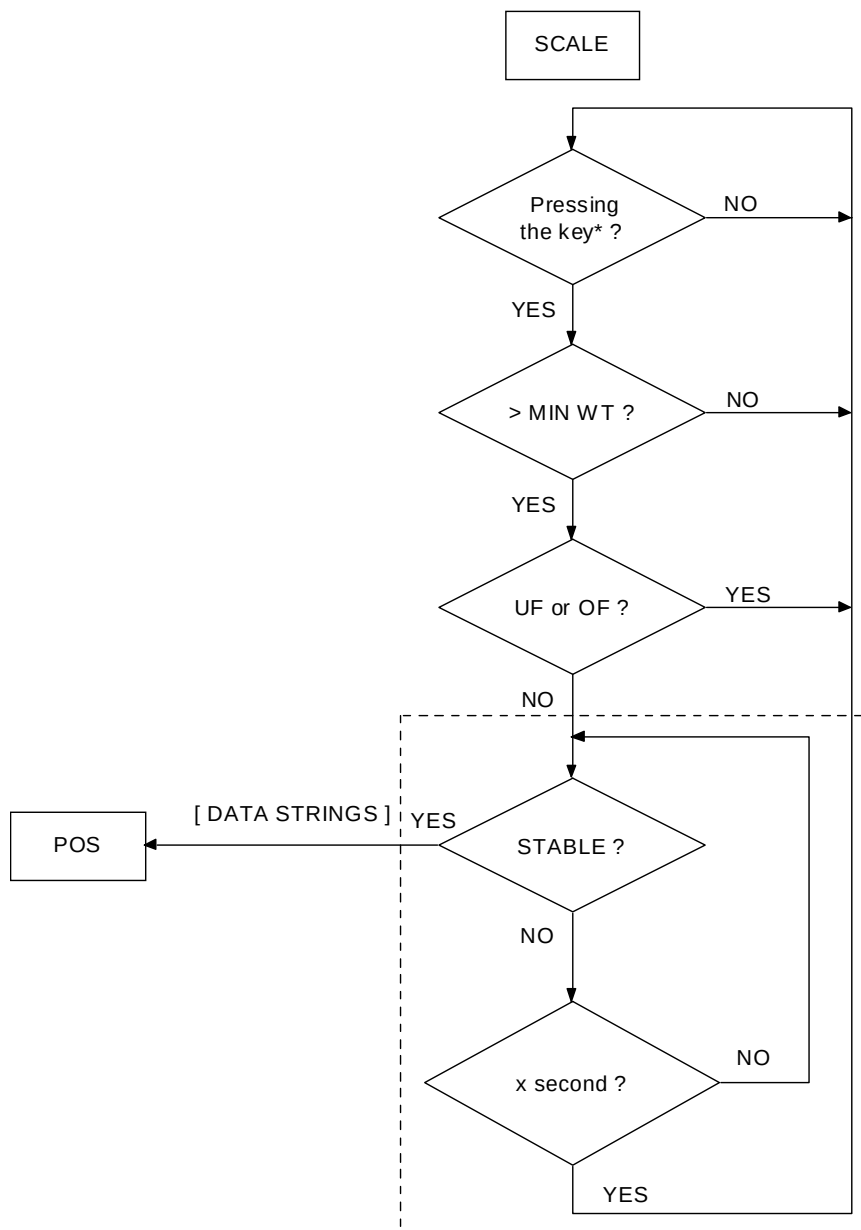
W6 ~ W1: Weight (from most to less significant digit).

W6: '-'(0x2d) when weight is negative.

W6: ' '(0x20) when weight is positive (zero).

DP: Decimal point '.'(0x2e), position of DP is changing the same as position of decimal point at display (*when the Price Base is \$/kg).

Note: The data string is not sent when weight is below minimum or overload.



***Note:** Weight stable check depends on SPEC setting.

7.2.9. ELITE Interface (Continuous Output)

DATA String Format:

STX	SIGN	W5	W4	W3	W2	W1	W0	SPACE	K	G	SPACE	U6	U5
-----	------	----	----	----	----	----	----	-------	---	---	-------	----	----

U4	U3	U2	U1	U0	SPACE	T6	T5	T4	T3	T2	T1	T0	CR	LF
----	----	----	----	----	-------	----	----	----	----	----	----	----	----	----

SIGN : '-' (0x2D) when weight is negative; ' ' (0x20) when weight is positive.

W5 ~ W0 : Weight data with decimal. " OF" when overflow, " UF" when underflow.

SPACE : ' ' (0x20)

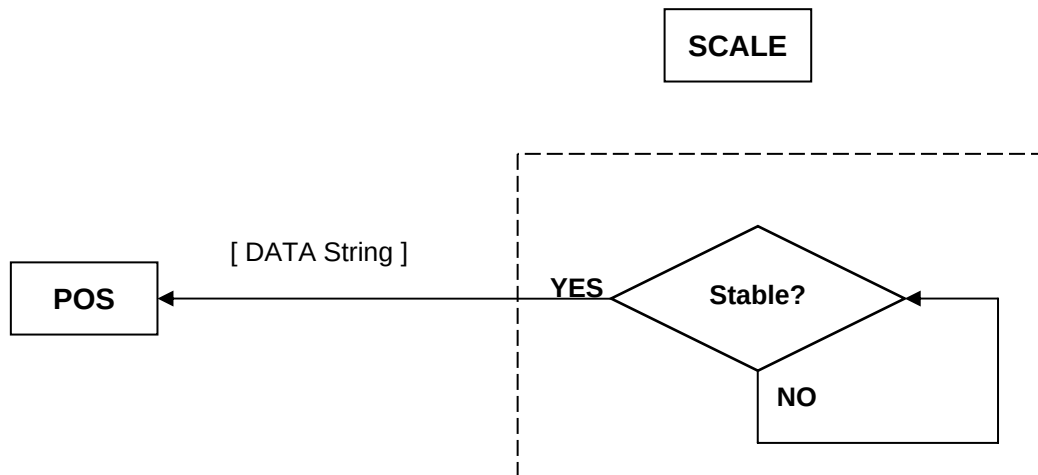
K : 'K' (0x4b)

G : 'G' (0x47)

U6 ~ U0 : Unit price data with decimal.

T6 ~ T0 : Total price data with decimal. " OF" when total price data overflow.
" " when weight data overflow or underflow.

Note 1: The position of decimal can change by setting SPEC.



*Note: Weight stable check depends on SPEC setting.

7.2.10. GAOTENG Interface (Manual Mode)

Send data by pressing sending key*.

DATA Strings Format:

0x2	0x20	Gross Weight	0x20	Tare Weight	0x20	Net Weight	Unit Price	Total Price
1B	1B	8B	1B	8B	1B	8B	8B	8B

0xd	0x20	0x20	0x20	0x20	ID Code	0x20	PLU Number	0x20	0xa
1B	1B	1B	1B	1B	2B	1B	6B	1B	1B

Gross Weight:

10	1	Decimal (0x2e)	10^{-1}	10^{-2}	10^{-3}	K(0x4b)	g (0x67)
----	---	----------------	-----------	-----------	-----------	---------	----------

Example:

1. Gross Weight is 11.350kg:

31	31	2e	33	35	30	4b	67
----	----	----	----	----	----	----	----

2. Gross Weight is 0.21kg:

20	30	2e	32	31	30	4b	67
----	----	----	----	----	----	----	----

Tare Weight:

10	1	Decimal (0x2e)	10^{-1}	10^{-2}	10^{-3}	K(0x4b)	g (0x67)
----	---	----------------	-----------	-----------	-----------	---------	----------

Same as Gross Weight.

Net Weight:

10	1	Decimal (0x2e)	10^{-1}	10^{-2}	10^{-3}	K(0x4b)	g (0x67)
----	---	----------------	-----------	-----------	-----------	---------	----------

Same as Gross weight.

Unit Price:

103	102	10	1	Decimal (0x2e)	10^{-1}	10^{-2}	¥ (0x9d)
-----	-----	----	---	----------------	-----------	-----------	----------

Example:

1. Unit Price is 1555.5;

31	35	35	35	2e	35	30	9d
----	----	----	----	----	----	----	----

2. Unit Price is 5.4.

20	20	20	35	2e	34	30	9d
----	----	----	----	----	----	----	----

3. No Unit Price

20	20	20	20	20	20	20	20
----	----	----	----	----	----	----	----

Total Price:

103	102	10	1	Decimal (0x2e)	10^{-1}	10^{-2}	¥ (0x9d)
-----	-----	----	---	----------------	-----------	-----------	----------

Same as unit price.

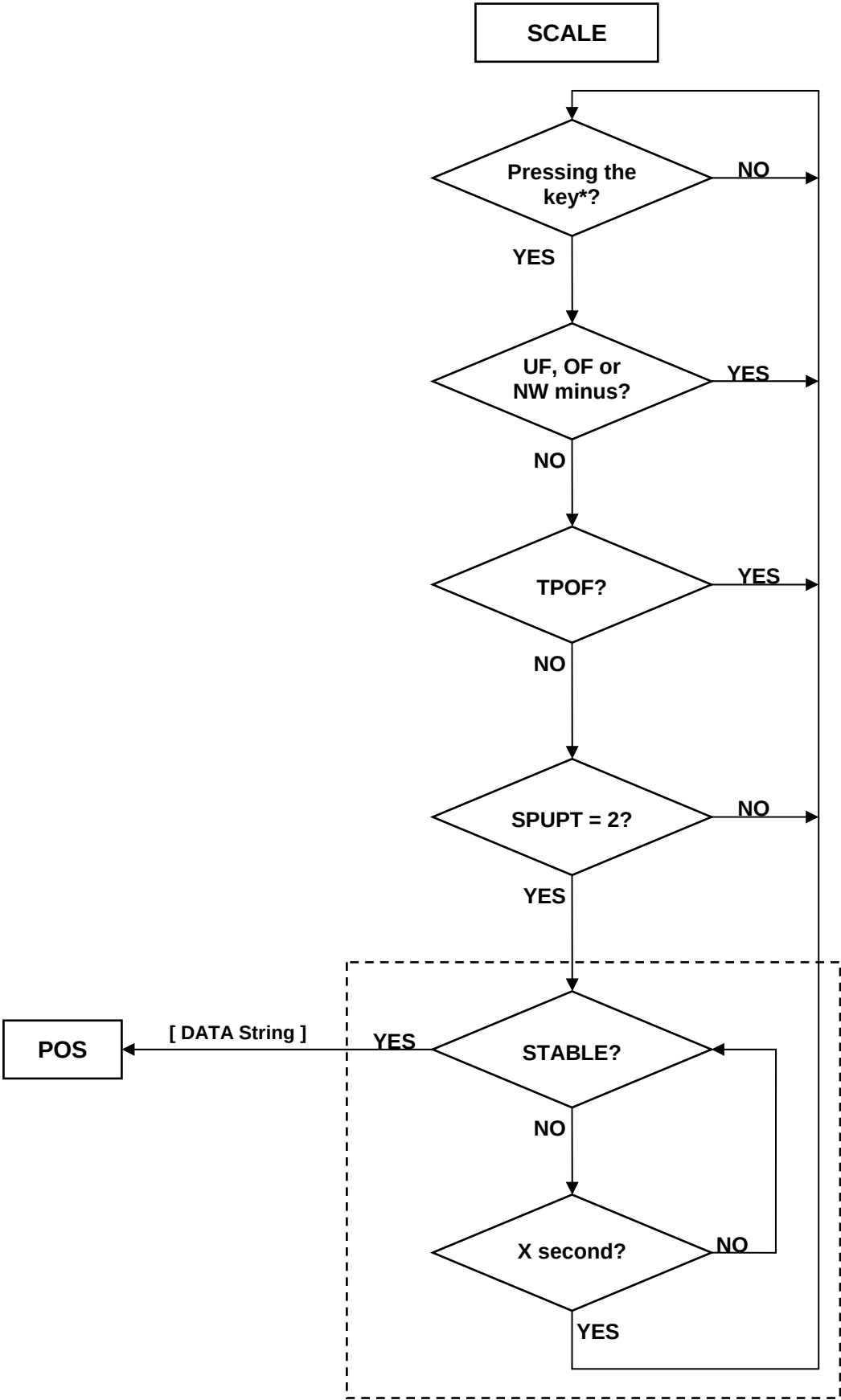
ID Code: Sales people's number, always 00.

30	30
----	----

PLU Number:

20	20	20	20	20	20
----	----	----	----	----	----

Data flow chart:



***Note 1:** Weight stable check depends on SPEC setting.

7.2.11. SHARP TK300/UP700 interface**Data Strings Format:**

-Record No. 01: transmission of unit price

EOT STX 0 1 ESC U5 U4 U3 U2 U1 U0 ESC ETX

-Record No. 03: transmission of unit price and tare value

EOT STX 0 3 ESC U5 U4 U3 U2 U1 U0 ESC T3 T2 T1 T0 ETX

-Record No. 04: transmission of unit price and text

EOT STX 0 4 ESC U5 U4 U3 U2 U1 U0 ESC A A ETX

-Record No. 05: transmission of unit price, tare value and text

EOT STX 0 5 ESC U5 U4 U3 U2 U1 U0 ESC T3 T2 T1 T0 ESC A A ETX

-Record No. 08: request for status information after receipt of NAK (response = record 09)

EOT STX 0 8 ETX

-ENQ: request for scale data (response = record 02)

EOT ENQ

-Record No. 02: valid weight value

STX 0 2 ESC X ESC W4 W3 W2 W1 W0 ESC U5 U4 U3 U2 U1 U0 ESC P5 P4 P3 P2 P1 P0 ETX

-Record No. 09: status information

STX 0 9 ESC S1 S0 ETX

-ACK: positive acknowledgement

-NAK: negative acknowledgement

- a) if scale has moved to error status
- b) if parity error has been detected on interface
- c) if incorrect record number has been detected
- d) if no valid unit price has been received
- e) if no valid tare value has been received
- f) if no valid text has been received
- g) if more than 50 characters have been received
- h) if scale has not yet stabilized
- i) if there was no movement since the last weighting operation
- j) if the scale is below the minimum load range
- k) if the scale is within the underload range
- l) if the scale is within the overload range

Data Definition:

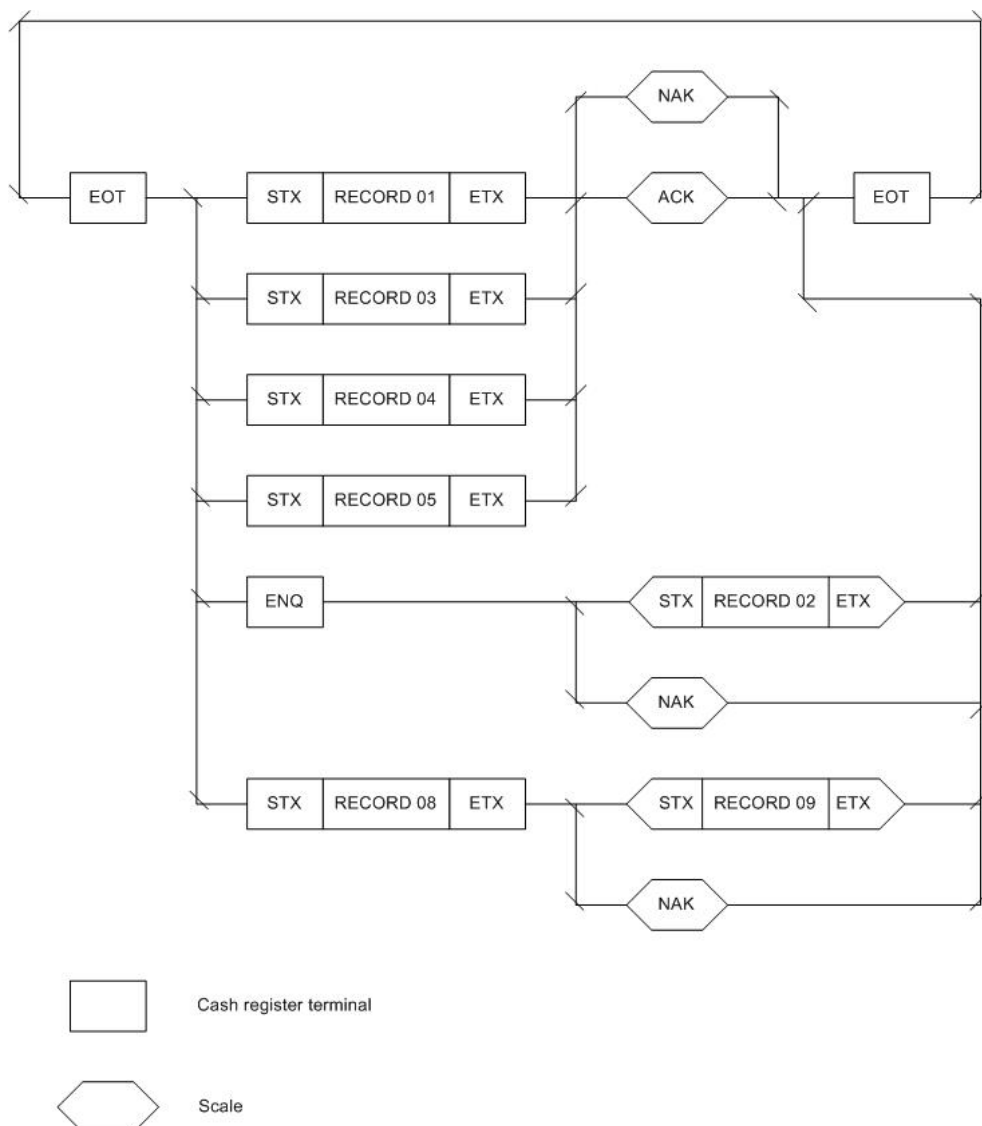
U5 ~ U0	Unit price (5/6 digits)
T3 ~ T0	Tare value (4 digits)
AA	Text (13 digits)
W5 ~ W0	Net weight (5 digits)
P5 ~ P0	Total price (6 digits)
X (0x33)	Scale status (always kg)

S1 S0 (status)

0	0	; there is no error present
0	1	; general error on the scale
0	2	; parity error or more characters than permitted
1	0	; incorrect record number detected
1	1	; unit price invalid
1	2	; no valid tare value received
1	3	; no valid text received
2	0	; scale has not yet stabilized (no equilibrium)
2	1	; no movement since the last weighting operation
2	2	; price calculation not yet made
3	0	; scale within minimum load range
3	1	; scale shows underload or negative weight value display
3	2	; scale within overload range

*Note: SPEC13 must be set 00xx.

SPEC14 must be set 1110.



7.2.12. UKRAINE interface

1. Command "TARE"

<0x00><0x00><0x01>

No reply from the scale. Command "TARE" to be executed.

2. Command "Enquiry with price"

<0x00><0x00><0x02><P1><P2><P3><P4><P5>

P1 to P5 designates price, starting from lowest figure. Junior tetrad for all bytes is all zeros. The scale displays the accepted pricing in "PRICE", calculate the amount and reply with 17 bytes sequence.

<W1><W2><W3><W4><W5><W6><P1><P2><P3><P4><P5><T1><T2><T3><T4><T5><T6>

W1 to W6 designates weight starting from lowest figure. Senior tetrad for all bytes is all zeros.

P1 to P5 designates weight starting from lowest figure. Senior tetrad for all bytes is all zeros.

T1 to T6 designates weight starting from lowest figure. Senior tetrad for all bytes is all zeros.

ECR SIDE		SCALE SIDE
1. ECR send "Enquiry with price"	<0x00><0x00><0x02><PRICE1> →	
	<WEIGHT><PRICE2><TOTAL> ←	2. If scale not stabilization without the answer. If scale stabilization do set the "PRICE1" to scale display, calculate the total sum and reply. Answer (17 bytes). PRICE1 = PRICE2

3. Command "Enquiry"

<0x00><0x00><0x03><0x00><0x00><0x00><0x00><0x00>

The scale reply is 17 bytes sequence

<W1><W2><W3><W4><W5><W6><P1><P2><P3><P4><P5><T1><T2><T3><T4><T5><T6>

W1 to W6 designates weight starting from lowest figure. Senior tetrad for all bytes is all zeros.

P1 to P5 designates weight starting from lowest figure. Senior tetrad for all bytes is all zeros.

T1 to T6 designates weight starting from lowest figure. Senior tetrad for all bytes is all zeros.

ECR SIDE		SCALE SIDE
1. ECR send "Enquiry"	<0x00><0x00><0x03><0x00><0x00><0x00><0x00><0x00> →	
	<WEIGHT><PRICE><TOTAL> ←	2. If scale not stable without the answer. If scale stable do answer (17 bytes)

Weight: designates weight starting from lowest figure. Format: <W1><W2><W3><W4><W5><W6>

Samples: Display 15.346 kg <0x36><0x34><0x33><0x35><0x31><0x30> (6 BYTE)

Price: designates price starting from lowest figure. Format: <P1><P2><P3><P4><P5>

Samples: Display 643.91<0x31><0x39><0x33><0x34><0x36> (5 BYTE)

Total: designates total sum starting from lowest figure. Format: <T1><T2><T3><T4><T5><T6>

Samples: Display 9374.56 <0x36><0x35><0x34><0x37><0x33><0x39> (6 BYTE)

*Note: Reply to command 2,3 to be provided only if weight and scale stabilization.