



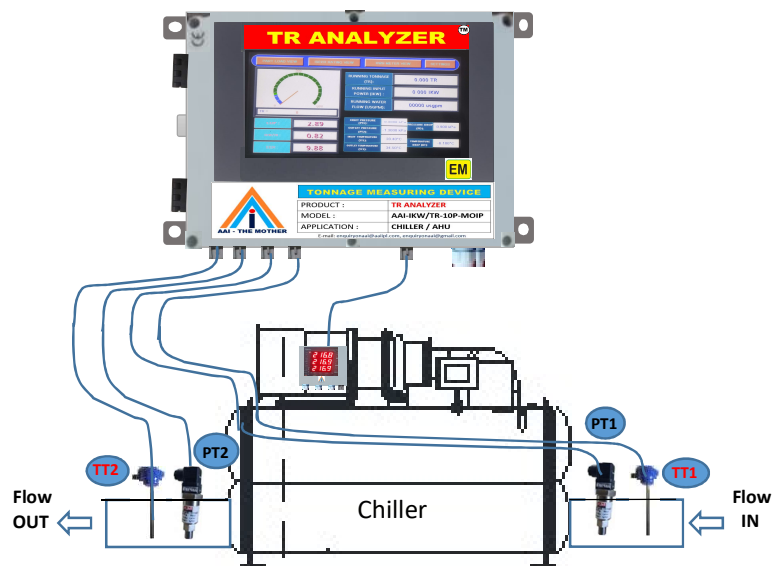
TR ANALYZERTM

TONNAGE MEASURING DEVICE

1. PRODUCT CATALOGUE

R-2512

TR ANALYZER - Tonnage Measuring Device for measuring actual running tonnage capacity of Chiller and AHU equipment based on DP type flow measuring principle and monitoring the performance of the equipment with part load data, NPLV data, ISEER data and Energy Star Rating of machine.



- ➔ Actual Running Tonnage (TR) measuring with inline water flow sensing based on Inlet - Outlet Pressure and Temperature.
- ➔ Superior in water FLOW measuring without requirement of 5D/3D distance criteria.
- ➔ Single Model to fit all pipe sizes and all tonnage capacity of Chiller / AHU from 0...4124 TR range.
- ➔ No Need to place extra flow switch or DP switch at chiller unit for water flow status contact.
- ➔ Real time Delta T and Delta P monitoring.
- ➔ IKW/TR and COP measuring in line with AHRI / ASHRAE format.
(for Advance 'IKW/TR' model)
- ➔ Part Load Performance monitoring in line with AHRI / ASHRAE format.
(for Advance 'IKW/TR' model)
- ➔ ISEER, Star Rating & NPLV performance monitoring.
(for Advance 'IKW/TR' model)
- ➔ Historical Data Logging upto 400 Days.
(for Advance 'IKW/TR' model)

Product Name :	: TR ANALYZER
Product Type :	: Running Capacity Tonnage Measuring Device
Product Application :	: HVAC
Application Medium :	: Water
Measuring TR Range :	: 0...4124 TR
Measuring Flow Range :	: 0...2498 m3/hr
Accuracy - Water Flow :	: $\pm 0.5\%$ of reading
Accuracy - Running TR :	: $\pm 1\%$ of FS
Pipe Size :	: 5mm....5000mm
Operating Pressure :	: 0..20 bar (as per selected Model)
Operating Temperature:	: -20...55°C
Measuring Data :	: Base TR Model = Running Capacity Tonnage (TR), Water Flow (usgpm), Water Flow Status (P.F.C.), Thermal Power (kW), Inlet/Outlet Pressure & Inlet/Outlet Temperature. : Advance IKW / TR Model = All Base TR Model Parameters + IKW / TR, COP, EER, ISEER, NPLV, Part Load Performance @ 100%,90%,75%,50%,25%, Thermal Power (kW), Electrical Power (IKW), Electrical Current (A), Electrical Voltage (V), Energy Star Rating from 1 Star to 5 Star.
Data Logging:	: Upto 400 Days (for Advance IKW/TR Model only)
Weight (Overall) :	: Base TR Model = 3.5 Kg : Advance IKW/TR Model = 11 Kg
Dimension (EM Device) :	: Base TR Model = 220mm (L) x 200mm (H) x 113 (D) : Advance IKW/TR Model = 336mm (L) x 258mm (H) x 113 (D)
Power Supply :	: 100...240 V +/- 10 % AC
IP Protection:	: TT/PT - IP66, EM / IKW Meter - IP20

* Chiller / AHU Design Selection sheet to be shared while placing order.

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TR ANALYZERTM

TONNAGE MEASURING DEVICE

1. PRODUCT CATALOGUE

R-2512

MODEL:

AAI	TR	P	MO
XXX	XXXXX	XXX	XXXX

TR :	TR = Base TR ANALYZER Model for measuring TR, Water Flow, Flow Status PFC, Inlet/Outlet Pressure & Temperature. IKW/TR = Advance TR ANALYZER Model for measuring additional IKW/TR, COP, EER, ISEER, NPLV, Part Load Performance, Power, Current, Voltage.
Line Pressure:	6P = upto 6 bar 10P = upto 10 bar 16P = upto 16 bar 20P = upto 20 bar
Monitoring Output :	MORS = Modbus over RS485 (2-wire) output (for Base 'TR' Model) MOIP = Modbus Ethernet/IP output (for Advance 'IKW/TR' Model) Note: Below default common output for Tonnage reading (only) is available : 4-20mA output = TR and IKW/TR option 0-10VDC output = TR option only

Sr. No.	Model No.	Modbus Output	Line Pressure	Output/s
1)	AAI-TR-6P-MORS	RS485 (2-wire)	6 bar	Running Capacity Tonnage (TR), Water Flow (usgpm), Water Flow Status (P.F.C.), Thermal Power (kW), Inlet/Outlet Pressure & Temperature, Maximum TR Design Value
2)	AAI-TR-10P-MORS	RS485 (2-wire)	10 bar	
3)	AAI-TR-16P-MORS	RS485 (2-wire)	16 bar	
4)	AAI-TR-20P-MORS	RS485 (2-wire)	20 bar	
5)	AAI-IKW/TR-6P-MOIP	Ethernet / IP	6 bar	Running Capacity Tonnage (TR), Water Flow (usgpm), Water Flow Status (P.F.C.), Thermal Power (kW), Inlet/Outlet Pressure & Temperature, Maximum TR Design Value, Electrical Power (IKW), Electrical Current (A), Electrical Voltage (V), IKW/TR, COP, EER, ISEER, NPLV, Loading Percentage, Energy Star Rating (1 Star to 5 Star).
6)	AAI-IKW/TR-10P-MOIP	Ethernet / IP	10 bar	
7)	AAI-IKW/TR-16P-MOIP	Ethernet / IP	16 bar	
8)	AAI-IKW/TR-20P-MOIP	Ethernet / IP	20 bar	

ACCESSORIES :

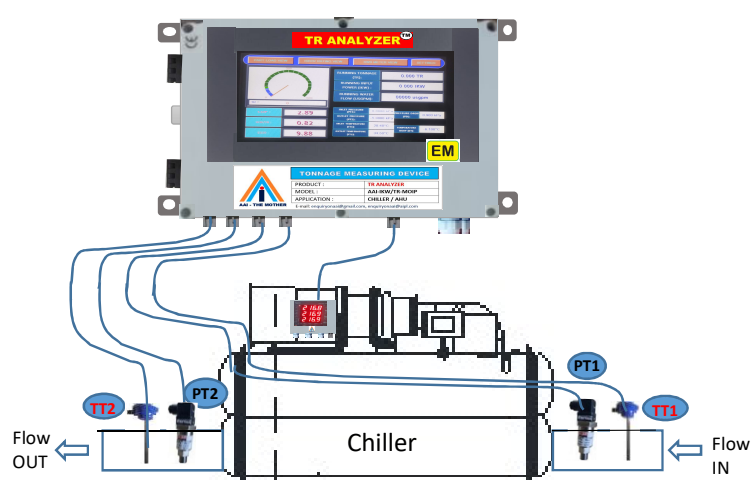
- 1) Ball Valve G $\frac{1}{4}$ " A for each PT1 and PT2 = Total quantity 2 Nos
- 2) Coupling of 3/4" for TT1 and TT2 = Total 2 Nos
- 3) Mounting plate / stand on pipe for EM unit Near PT2

- 4) Kwh Meter, CT and It's cable is considered only for LT Panel. If it is HT Panel, then CT, VT and it's cable shall be in Client Scope. Required Power Supply cables in Client Scope.
- * Accessories are not part of this product. End buyer has to arrange locally.

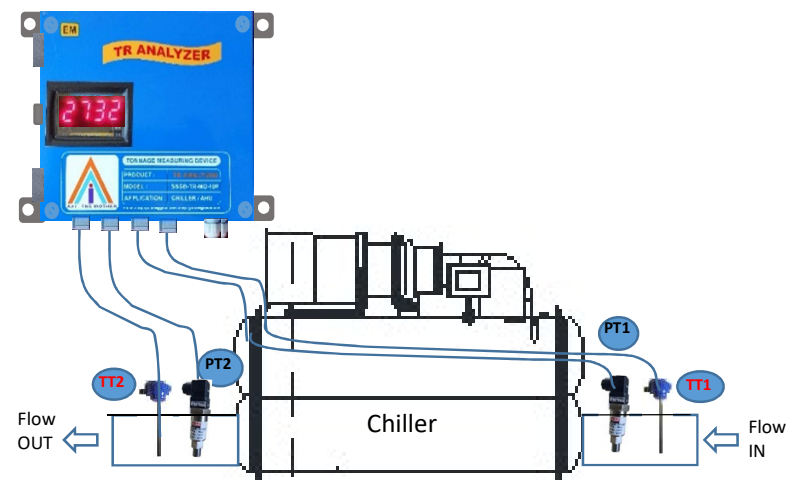
INSTALLATION STEP:

Installation of TR ANALYZER :

For Advance "IKW/TR" Model

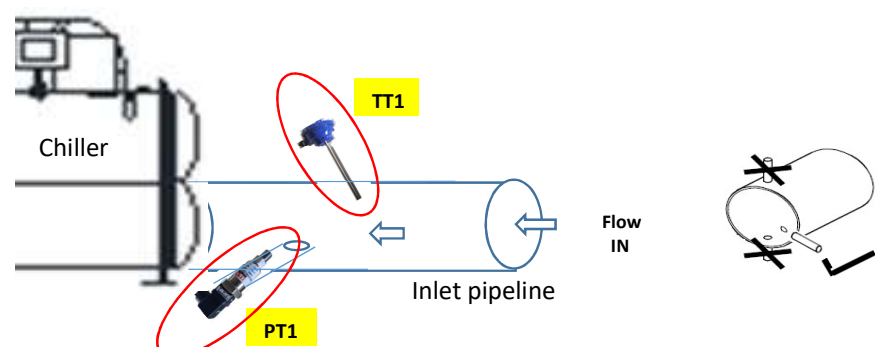


For Base "TR" Model



STEP-1 : Part-1 : INLET- PT1 & TT1 Installation :

- Location = **Inlet Pipe** of the Chiller / AHU
Connection = G $\frac{1}{4}$ " A for PT and 2/3" well for TT into the Pipe
Direction = 45° angle opposite to the water flow
Position = 35% bottom side of the pipe



Description : Ensure PT1 pressure transmitter is installed at **INLET** line only. Ensure Ball valve to be installed prior to the PT for isolation and maintenance purpose.

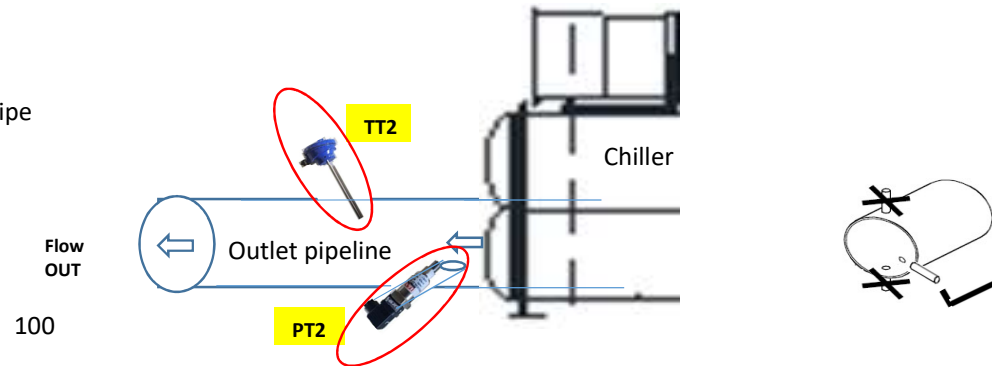
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STEP-2 : Part-2 : OUTLET- PT2 & TT2 Installation :

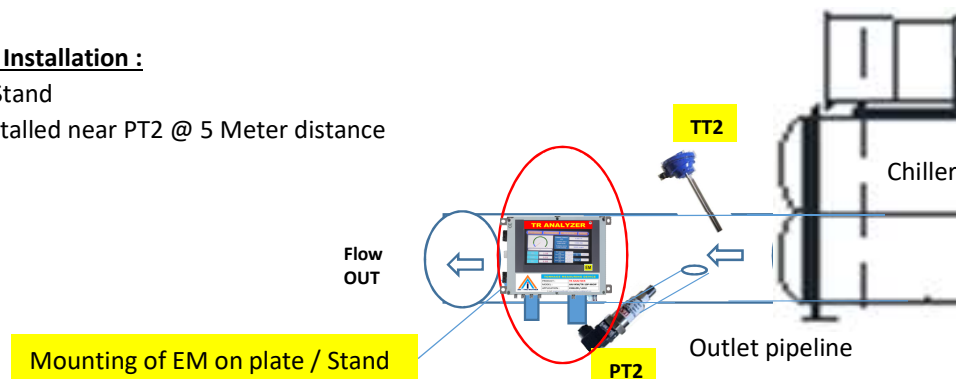
Location = **Outlet Pipe** of the Chiller / AHU
 Connection = G $\frac{3}{4}$ " A for PT and 2/3" well for TT into the Pipe
 Direction = 45° angle opposite to the water flow
 Position = 35% bottom side of the pipe



Description : Ensure PT2 pressure transmitter is installed at **OUTLET** line only. Ensure Ball valve to be installed prior to the PT for isolation and maintenance purpose.

STEP-3 : Part-3 : Electronic Module - EM Installation :

Connection = Mounting plate / Stand
 Mounting plate / stand to be installed near PT2 @ 5 Meter distance



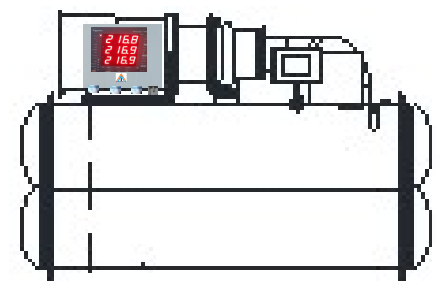
Description : Ensure EM module is installed near to PT2 at **OUTLET** line only within 5 Meter distance from PT/TT. Ensure Mounting Plate / Stand being installed.

(Note : Electronic Module for TR option will be of different size and it will not have Touch Panel Display)

STEP-4 : Part-4 : Kwh Meter & CT Installation (for Advance 'IKW/TR' Model only) :

Location = **Inside Chiller Panel**
 Installation of Kwh Meter = To be installed inside Chiller Panel.
 Installation of CT = To be installed in each R phase, Y phase and B phase respectively.
 Termination of Cable = Each Cable of Current & Voltage to be installed as per guideline.

Very Important = 1) All Kwh Meter, CT and Cable Termination To be installed by well trained Electrical Technical person only.
 2) Supply of CT, VT and it's cable for HT Panel is in client scope.



TERMINAL WIRING :

For Advance "IKW/TR" Model

(FUTURE)	-RS/13	T1
	+RS/14	T2
0-10V DC TR Output	+AO3/3	T3
	-GND/12	T4
4-20mA TR Output	+AO5/5	T5
	-GND/12	T6
Flow PFC Status Output	+DO1/16	T7
	-DO1/19	T8
100~230V AC	L	T9
	N	T10

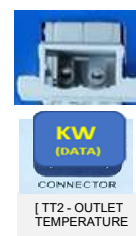


Mobus TCP/IP Output

For Base "TR" Model

MODBUS / RS485	-RS/13	T1
	+RS/14	T2
0-10V DC TR Output	+AO3/3	T3
	-GND/12	T4
4-20mA TR Output	+AO5/5	T5
	-GND/12	T6
Flow PFC Status Output	+DO1/16	T7
	-DO1/19	T8
100~230V AC	L	T9
	N	T10

SENSOR WIRING :



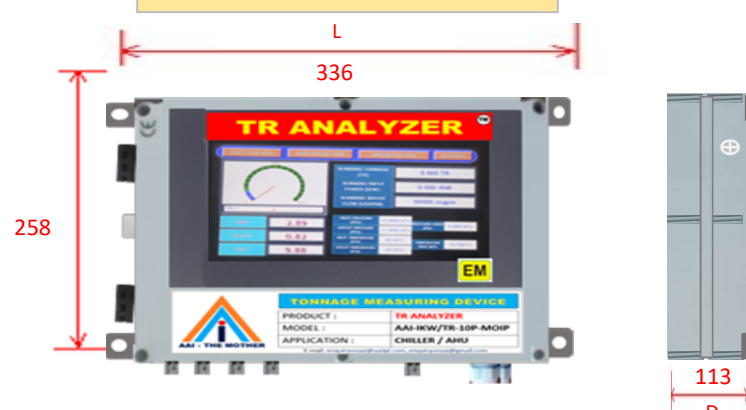
SENSOR WIRING :



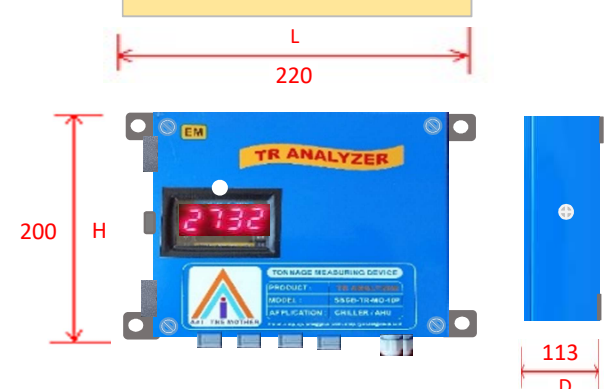
DIMENSIONS (in MM) :

EM Display Unit :

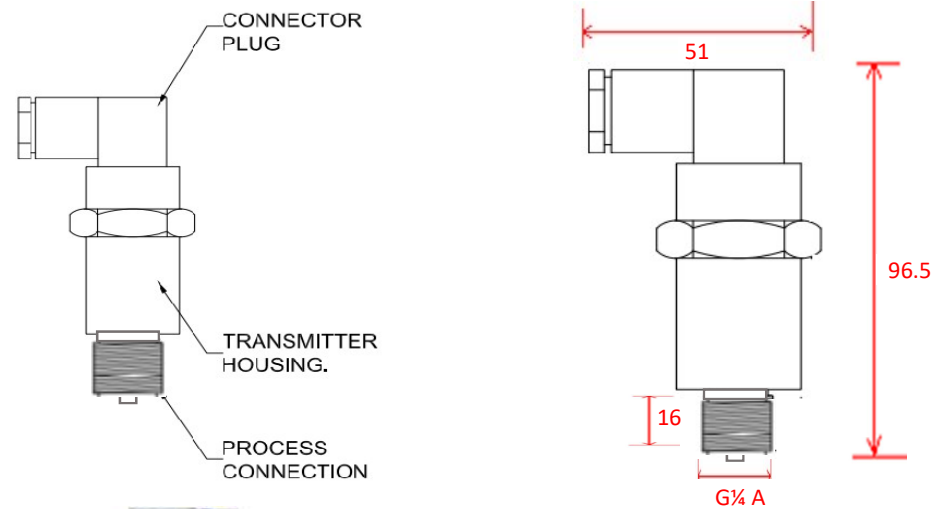
For Advance "IKW/TR" Model



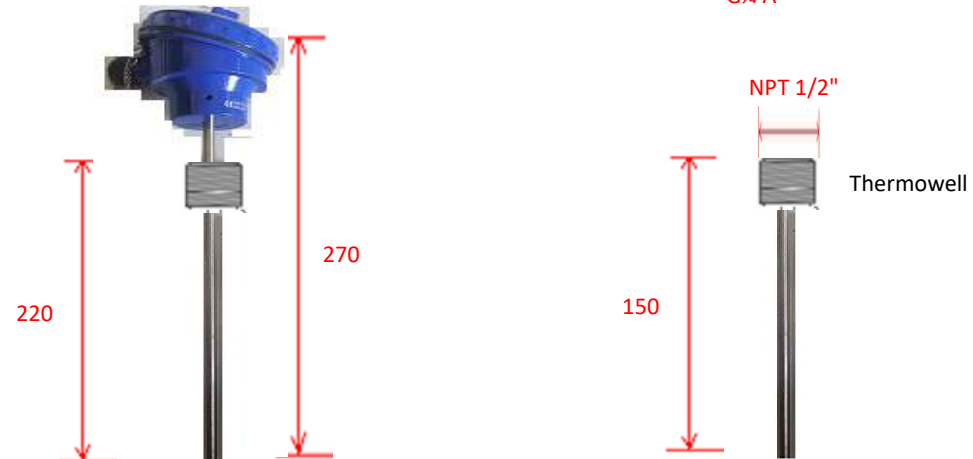
For Base "TR" Model



Pressure Transmitter Unit (PT1 & PT2) :

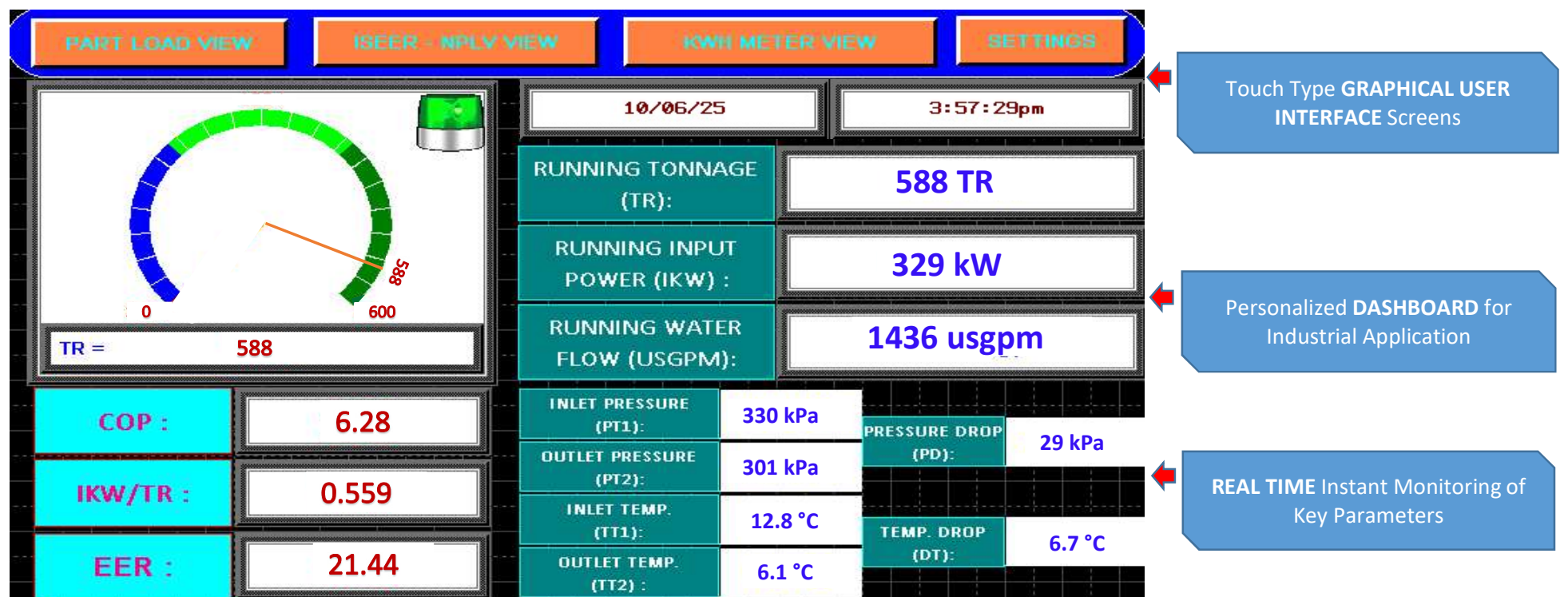


Temperature Transmitter Unit (TT1 & TT2) :



INSIGHTS SCREENS :

For Advance "IKW/TR" Model



PART LOAD PERFORMANCE @ 100%, 90%, 75%, 50% and 25%

Display of Data in-line with AHRI /ASHRAE Tabular Format

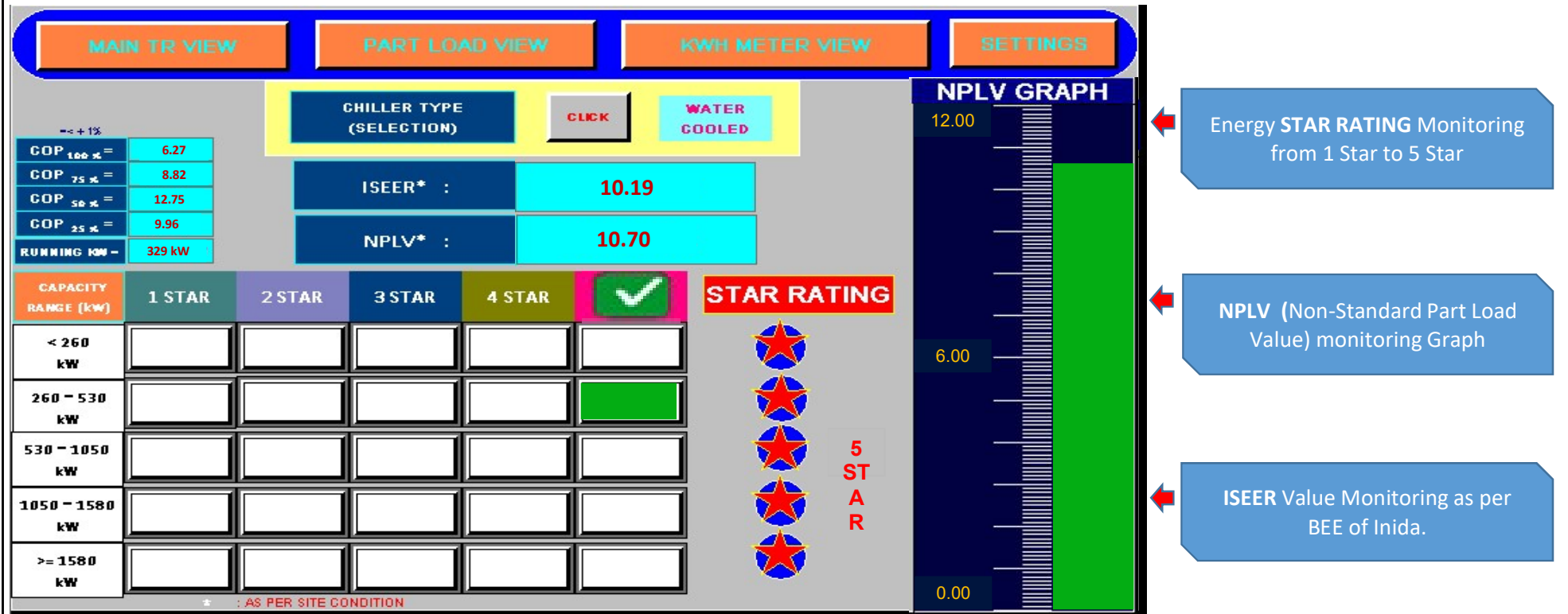
Factory Design V/s On-Site Value comparison

MAIN TR VIEW									
ISEER - NPLV VIEW									
KWH METER VIEW									
SETTINGS									
% Load	Capacity (TR)	Input Power (IKW)	Efficiency (IKW/TR)	RLA (Amp)	Flow (usgpm)	Tin (°C)	Tout (°C)	PD (kPa)	
RUNNING DATA									
98 %	588 TR	329 kW	0.559	493 A	1436 gpm	12.8 °C	6.7 °C	29 kPa	
PART LOAD DATA									
=<> ± 5%									
100%	100 %	598 TR	335 kW	0.560	502 A	1436 gpm	12.1 °C	6.5 °C	29 kPa
90%	92 %	553 TR	255 kW	0.478	461 A	1436 gpm	11.1 °C	6.4 °C	29 kPa
75%	74 %	449 TR	179 kW	0.398	370 A	1436 gpm	10.8 °C	6.4 °C	29 kPa
50%	50 %	301 TR	83 kW	0.275	267 A	1436 gpm	9.4 °C	6.3 °C	29 kPa
25%	26 %	153 TR	54 kW	0.352	136 A	1436 gpm	8.1 °C	6.0 °C	29 kPa
CLICK --> SITE V/S DESIGN									

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Factory Design V/s On-Site Value @ 100%, 75%, 50% and 25%

Provision to feed Factory Design Data as per Chiller TDS

Deep comparison from 25% to 100% at Part Load

		% Load	Capacity (TR)	Input Power (IKW)	Efficiency (IKW/TR)	RLA (Amp)	Flow (usgpm)	Tin (°C)	Tout (°C)	PD (kPa)
NOTE : ENTER DESIGN DATA MANUALLY IN RED COLOUR										
100%	100 %	598 TR	335 kW	0.560	502 A	1436 gpm	12.1 °C	6.5 °C	29 kPa	
DESIGN -> (e100%)	100 %	600 TR	337 kW	0.557	502 A	1436 gpm	12.4 °C	6.6 °C	29 kPa	
75%	74 %	449 TR	179 kW	0.398	370 A	1436 gpm	10.8 °C	6.4 °C	29 kPa	
DESIGN -> (e75%)	75 %	450 TR	180 kW	0.390	372 A	1436 gpm	10.8 °C	6.4 °C	29 kPa	
50%	50 %	301 TR	83 kW	0.275	267 A	1436 gpm	9.4 °C	6.3 °C	29 kPa	
DESIGN -> (e50%)	50 %	300 TR	83 kW	0.270	267 A	1436 gpm	9.45 °C	6.35 °C	29 kPa	
25%	26 %	153 TR	54 kW	0.352	136 A	1436 gpm	8.1 °C	6.0 °C	29 kPa	
DESIGN -> (e25%)	25 %	150 TR	53 kW	0.353	137 A	1436 gpm	8.1 °C	6.0 °C	29 kPa	

DATA LOGGING
(Upto 400 Days)

PARAMETERS	VALUE	DATA LOG	PARAMETERS	VALUE	DATA LOG
CAPACITY TONNAGE (TR)	598 TR	→	EFFICIENCY (IKW/TR)	0.559	→
WATER FLOW (usgpm)	1436 gpm	→	COP	6.28	→
INPUT POWER (IKW)	335 kW	→	EER	21.44	→
INPUT CURRENT (Amp)	502 A	→	ISEER	10.19	→
PERCENT LOAD (%)	100 %	→	NPLV	10.70	→
Tin (Inlet Temp °C)	12.1 °C	→	1 STAR RATING		→
Tout (Outlet Temp °C)	6.5 °C	→	2 STAR RATING		→
Pin (Inlet Pressure kPa)	330 kPa	→	3 STAR RATING		→
Pout (Outlet Pressure kPa)	301 kPa	→	4 STAR RATING		→
PD (Press. Drop kPa)	29 kPa	→	5 STAR RATING		→

DATA LOGGING upto 400days for all essential parameters.

Every 30 Sec data gets logged.

Easily Diganosing the History of Machine more than 1 year