



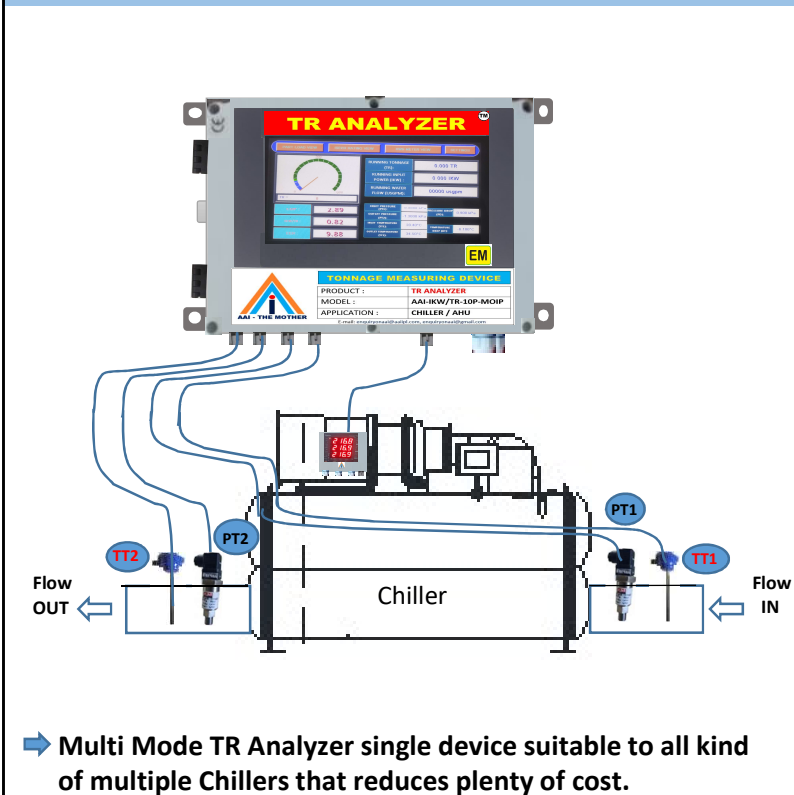
TR ANALYZERTM

TONNAGE MEASURING DEVICE

1. PRODUCT CATALOGUE

R-2603

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)
- ➔ Multi Mode TR Analyzer single device suitable to all kind of multiple Chillers that reduces plenty of cost.

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 :	: ± 0.5% of reading
Accuracy - Running TR :	: ± 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.), Inlet/Outlet Pressure & Temperature. : Advance IKW / TR Model = In addition to Base TR Model, IKW / TR, COP, EER, ISEER, NPLV, Part Load Performance @ 100%,90%,75%,50%,25%, Power, Current, Voltage, Energy Star Rating from 1 Star to 5 Star
Data Logging:	: Upto 400 Days (for Advance IKW/TR Model only)
Weight (Overall) :	: 3.5 Kg ~ 20 Kg on selection of Model
Dimension (EM Device) :	: Base TR Model = 220mm (L) x 200mm (H) x 113mm (D) : Advance IKW/TR Model = 336mm (L) x 258mm (H) x 113mm (D) : Multi-Mode Analyzer Model (MM-N) = 596mm (L) x 388mm (H) x183mm (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. * Size shall be varied

E-mail:

enquiryonaai@gmail.com

enquiryonaai@aaipl.com



TR ANALYZERTM

TONNAGE MEASURING DEVICE

1. PRODUCT CATALOGUE

R-2603

MODEL:		AAI	TR	P	MO	MM-N
		XXX	XXXXX	XXX	XXXX	XX-X
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 Hardpoint output for Tonnage (TR) parameter is available: 4-20mA output = TR option as well as IKW/TR option 0-10VDC output = TR option only (Hardpoint output is available for Multi Mode Analyzer)					
MM-N :	MM = Multi-Mode TR Analyzers for multiple Chiller/AHU N = Number of TR Analyzers combined for multiple units (2...to...12 Numbers)					

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.), Inlet/Outlet Pressure & Temperature, (BTU optional)
2)	AAI-TR-10P-MORS		10 bar	
3)	AAI-TR-16P-MORS		16 bar	
4)	AAI-TR-20P-MORS		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.), Inlet/Outlet Pressure & Temperature, IKW/TR, COP, EER, ISEER, NPLV, Part Load Performance, Energy Star Rating (1 Star to 5 Star), Power, Current, Voltage.
6)	AAI-IKW/TR-10P-MOIP		10 bar	
7)	AAI-IKW/TR-16P-MOIP		16 bar	
8)	AAI-IKW/TR-20P-MOIP		20 bar	
	Multi-Mode TR Analyzer Models:			
9)	AAI-TR-6P-MORS-MM-N	RS485 (2-wire)	6 bar	Running Capacity Tonnage (TR), Water Flow (usgpm), Water Flow Status (P.F.C.), Inlet/Outlet Pressure & Temperature, (BTU optional)
10)	AAI-TR-10P-MORS-MM-N		10 bar	
11)	AAI-TR-16P-MORS-MM-N		16 bar	
12)	AAI-TR-20P-MORS-MM-N		20 bar	
13)	AAI-IKW/TR-6P-MOIP-MM-N	Ethernet / IP	6 bar	Running Capacity Tonnage (TR), Water Flow (usgpm), Water Flow Status (P.F.C.), Inlet/Outlet Pressure & Temperature, IKW/TR, COP, EER, ISEER, NPLV, Part Load Performance, Energy Star Rating (1 Star to 5 Star), Power, Current, Voltage.
14)	AAI-IKW/TR-10P-MOIP-MM-N		10 bar	
15)	AAI-IKW/TR-16P-MOIP-MM-N		16 bar	
16)	AAI-IKW/TR-20P-MOIP-MM-N		20 bar	

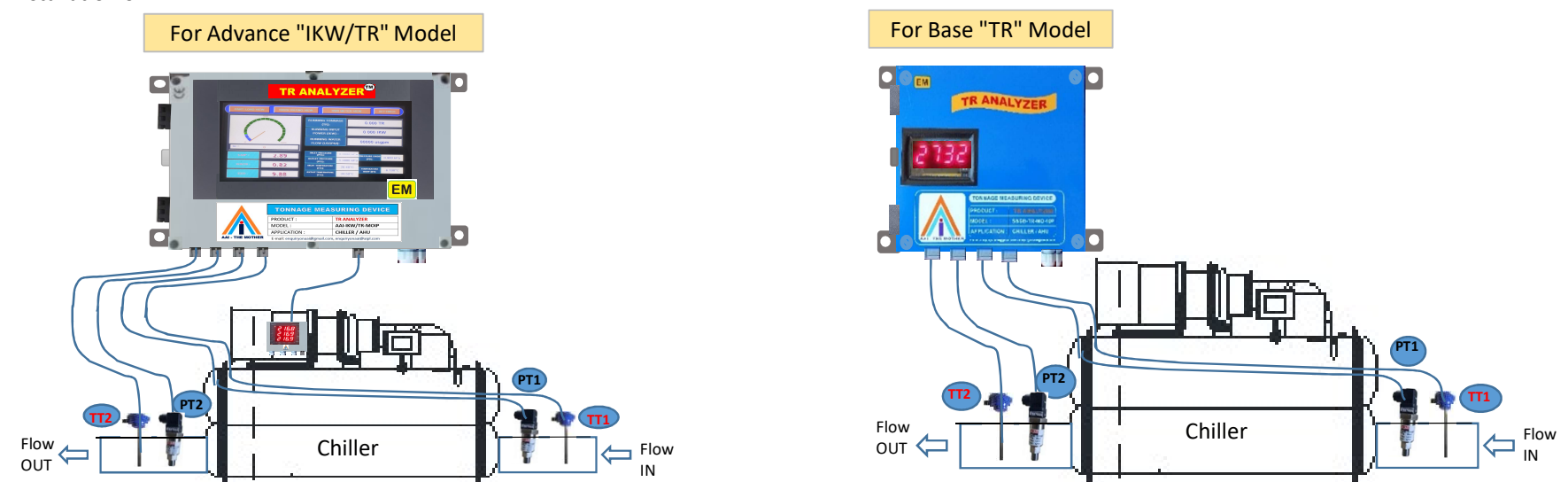
ACCESSORIES* : * Accessories are not part of this product. End buyer has to arrange locally.

- 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.
- 5) All cables for Multi-Mode TR Analyzer model (MM-N) shall be in buyer's scope.

INSTALLATION STEP:

Installation of TR ANALYZER :



E-mail:

enquiryonaai@gmail.com

enquiryonaai@aaipl.com



TR ANALYZERTM

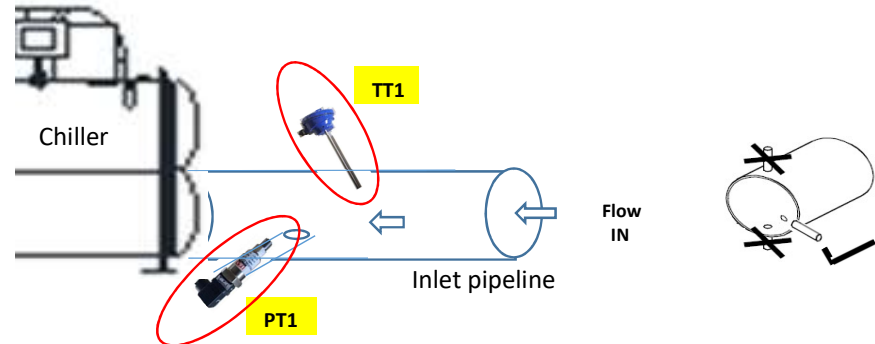
TONNAGE MEASURING DEVICE

1. PRODUCT CATALOGUE

R-2603

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

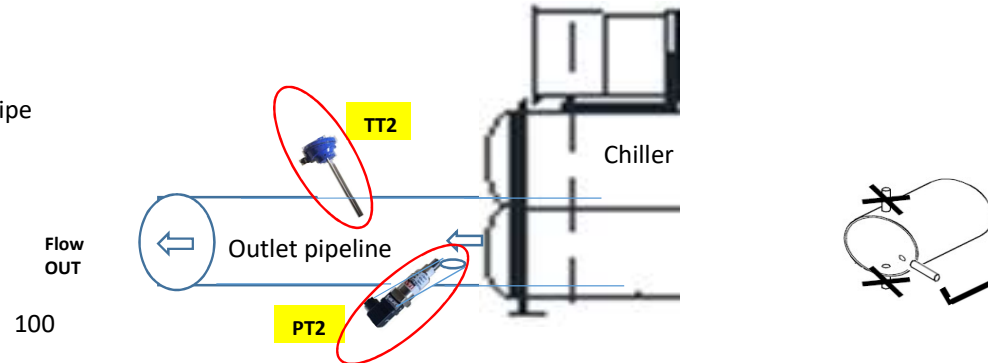
Location = **Inlet Pipe** of the Chiller / AHU
Connection = G $\frac{1}{4}$ " A for PT and 2/3" well for TT into the Pipe
Direction = 45° angle opposite to the water flow
Position = 35% bottom side of the pipe



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.

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

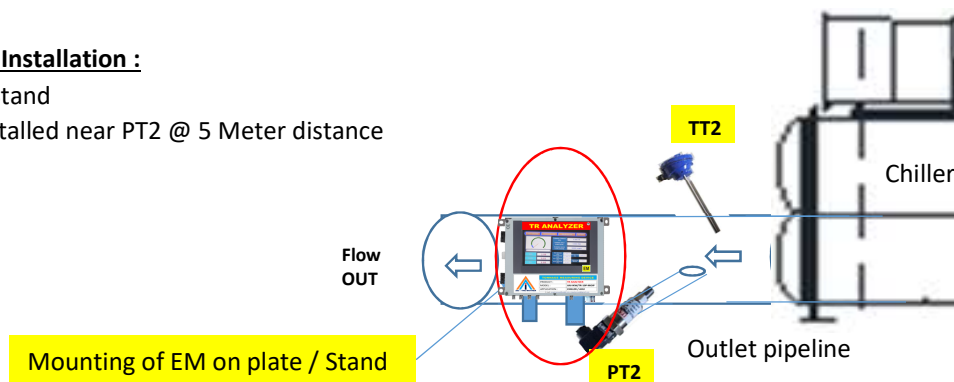
Location = **Outlet Pipe** of the Chiller / AHU
Connection = G $\frac{1}{4}$ " A for PT and 2/3" well for TT into the Pipe
Direction = 45° angle opposite to the water flow
Position = 35% bottom side of the pipe



Description : Ensure 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



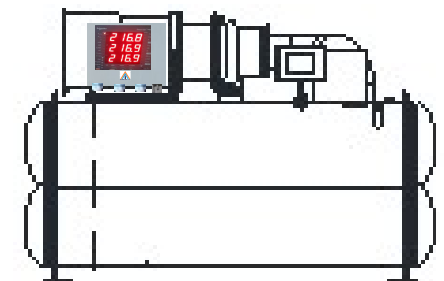
Description : Ensure EM module is installed near to PT2 at **OUTLET** line only within 5 Meter distance from PT/TT. Ensure Mounting Plate / Stand being installed.

(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

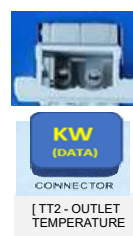


Mobus TCP/IP Output

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 :





TR ANALYZERTM

TONNAGE MEASURING DEVICE

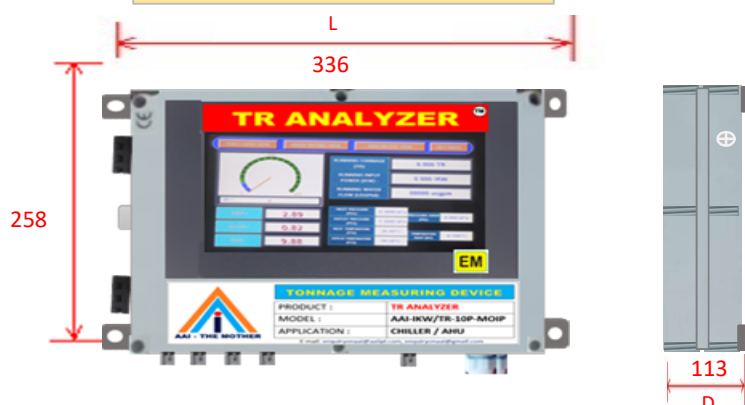
1. PRODUCT CATALOGUE

R-2603

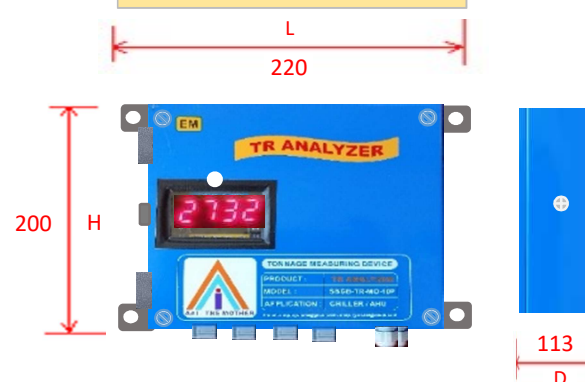
DIMENSIONS (in MM) :

EM Display Unit :

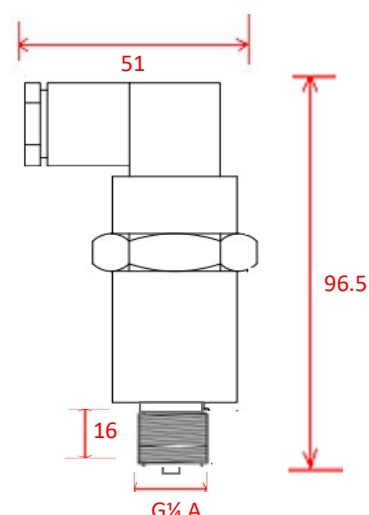
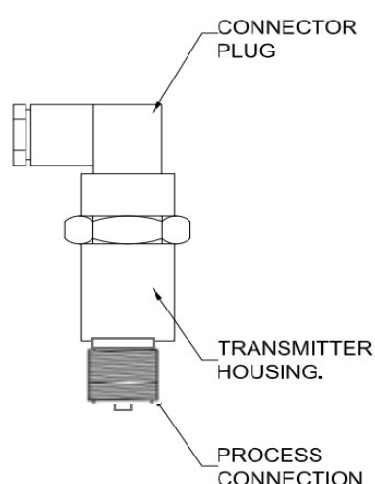
For Advance "IKW/TR" Model



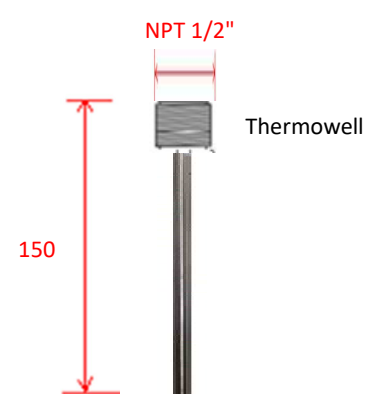
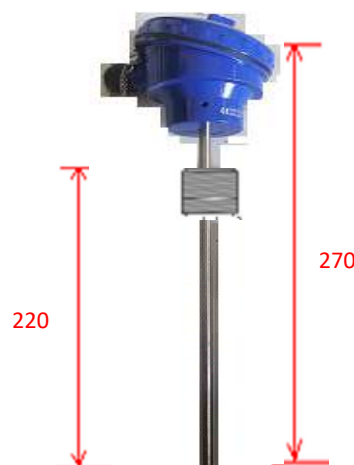
For Base "TR" Model



Pressure Transmitter Unit (PT1 & PT2) :

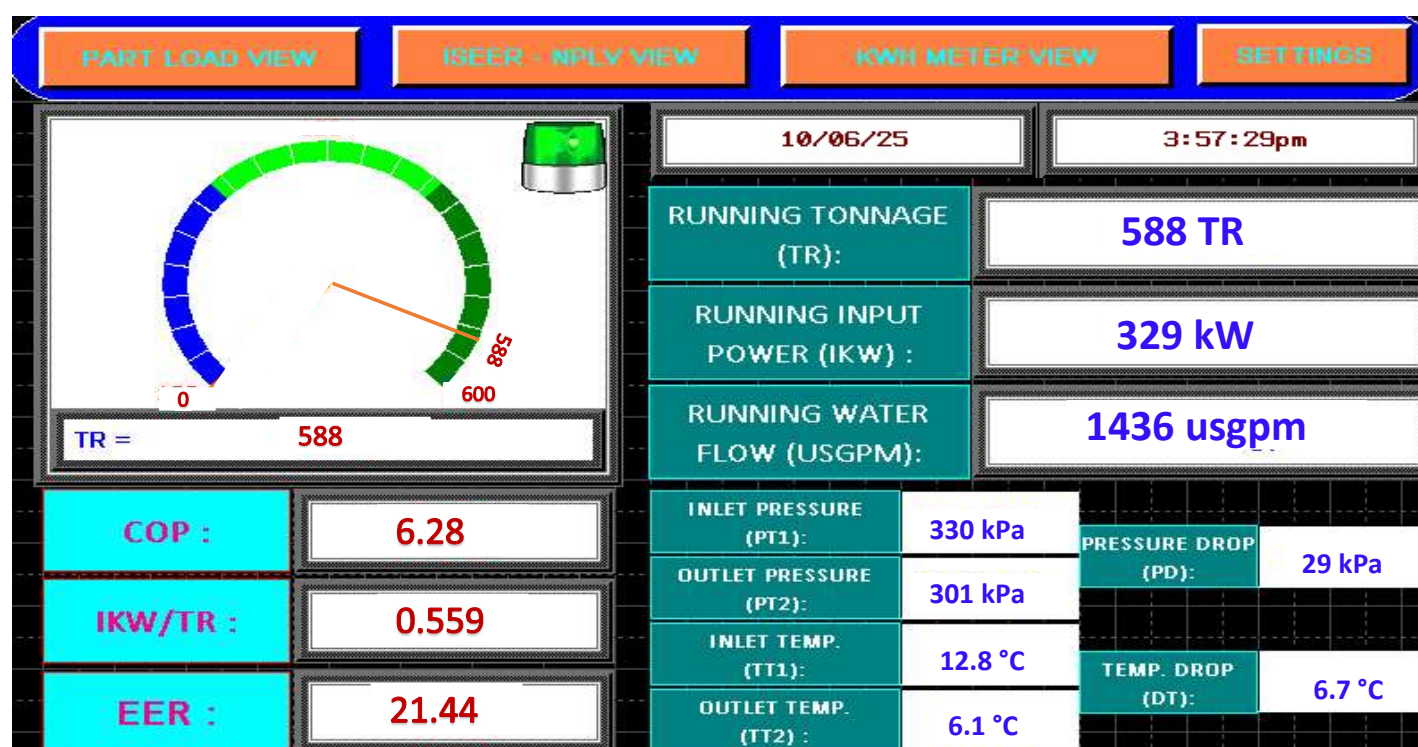


Temperature Transmitter Unit (TT1 & TT2) :



INSIGHTS SCREENS :

For Advance "IKW/TR" Model



Touch Type GRAPHICAL USER INTERFACE Screens

Personalized DASHBOARD for Industrial Application

REAL TIME Instant Monitoring of Key Parameters



TR ANALYZERTM

TONNAGE MEASURING DEVICE

1. PRODUCT CATALOGUE

R-2603

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									
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

MAIN TR VIEW
PART LOAD VIEW
KWH METER VIEW
SETTINGS

CHILLER TYPE (SELECTION)
CLICK
WATER COOLED

ISEER* : 10.19
NPLV* : 10.70

CAPACITY RANGE (kW)
1 STAR
2 STAR
3 STAR
4 STAR
5 STAR

STAR RATING

NPLV GRAPH

Energy STAR RATING Monitoring from 1 Star to 5 Star

NPLV (Non-Standard Part Load Value) monitoring Graph

ISEER Value Monitoring as per BEE of India.

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

BACK
PART LOAD DATA - COMPARISON
SITE VS DESIGN

% 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



TR ANALYZERTM

TONNAGE MEASURING DEVICE

1. PRODUCT CATALOGUE

R-2603

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