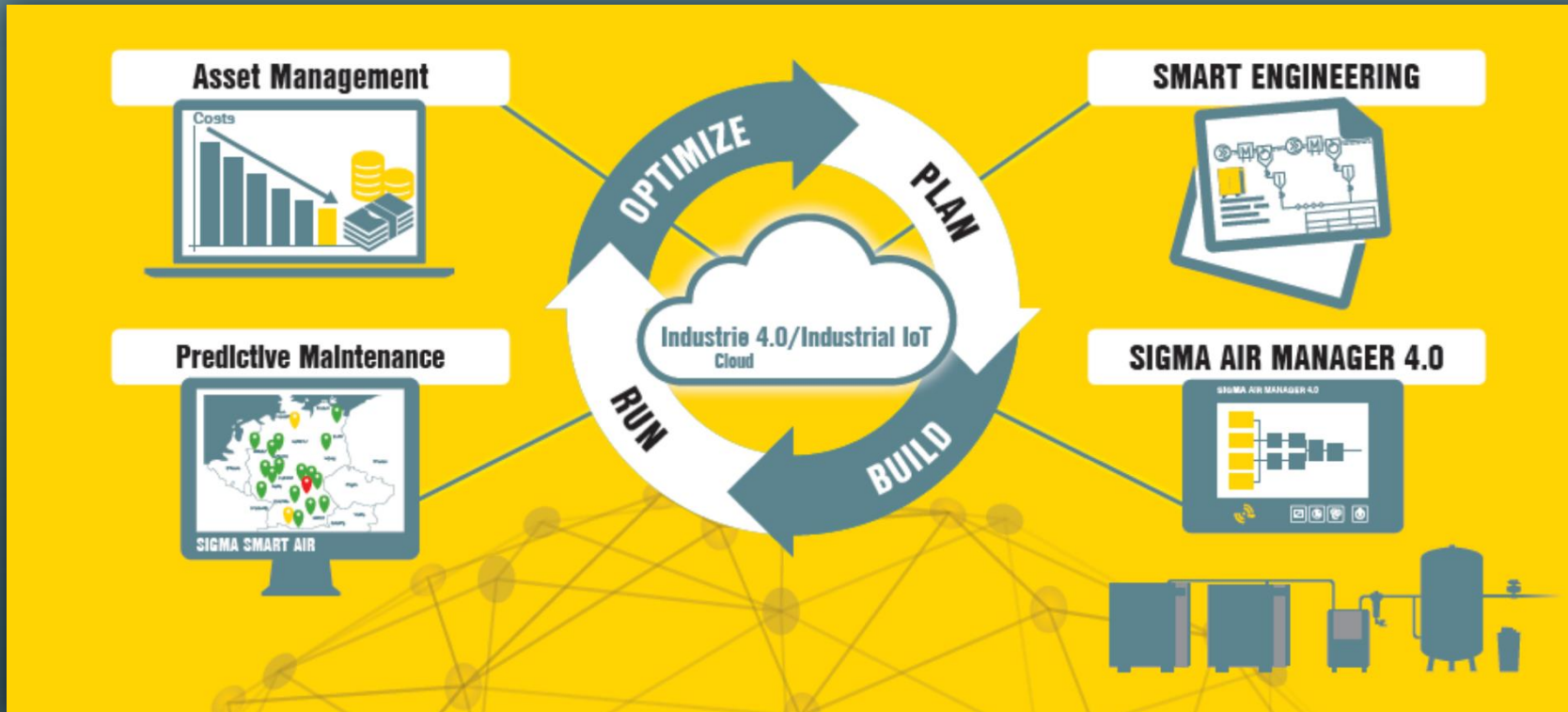


Smart Air Strategy Execution



Company Profile

Founded 1919 in Coburg

Manufacturing in Germany

Sales & Service in EMEA ↔ Americas ↔ APAC

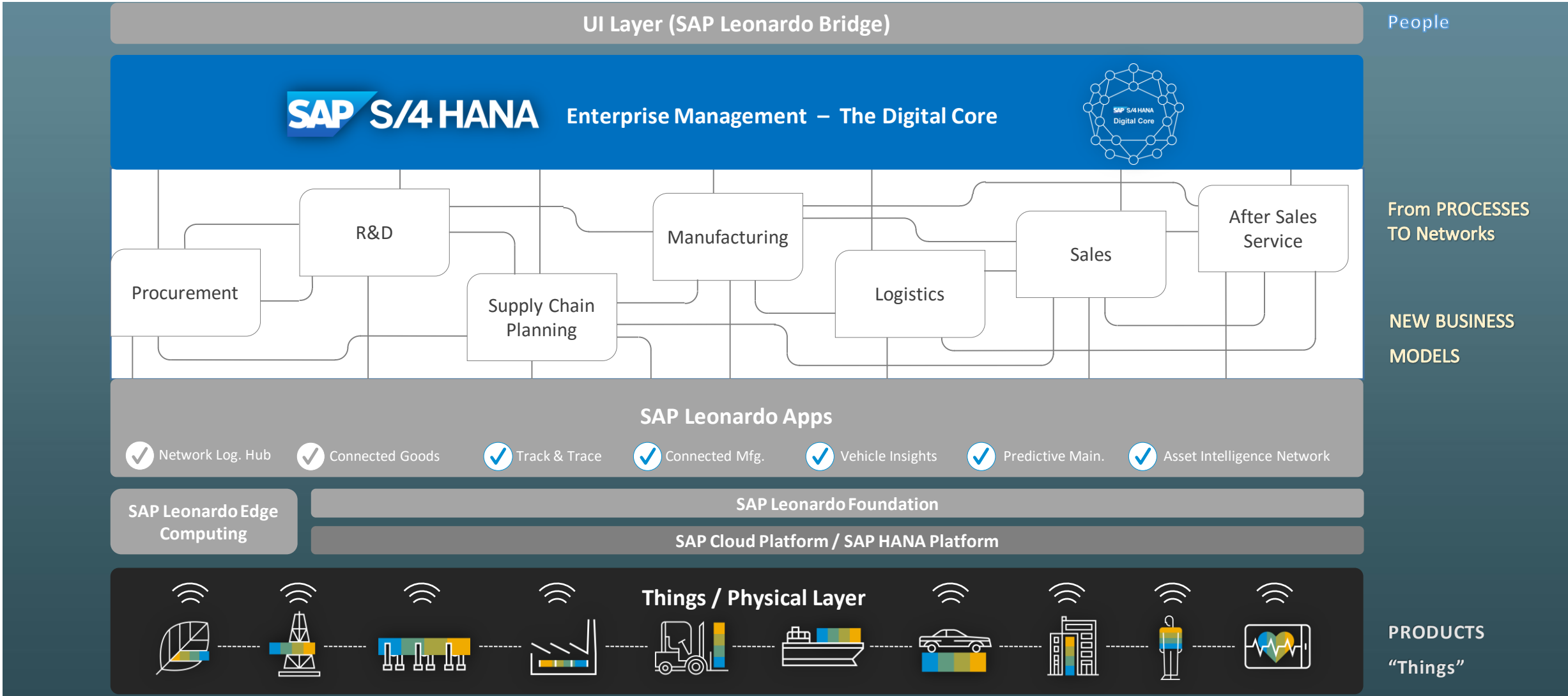
~ 6.000 Employees



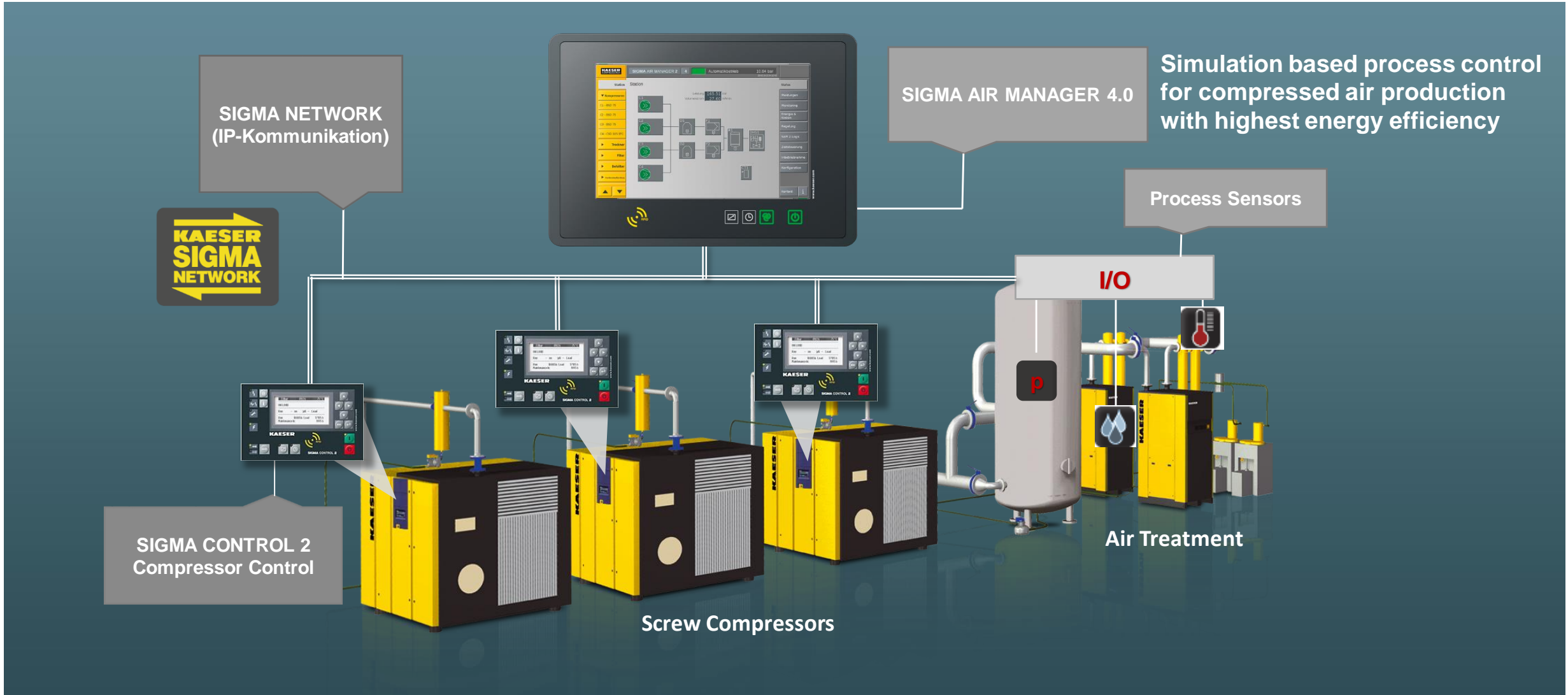
Global IT Infrastructure



SAP Leonardo & Digitizing Business: The Big Picture

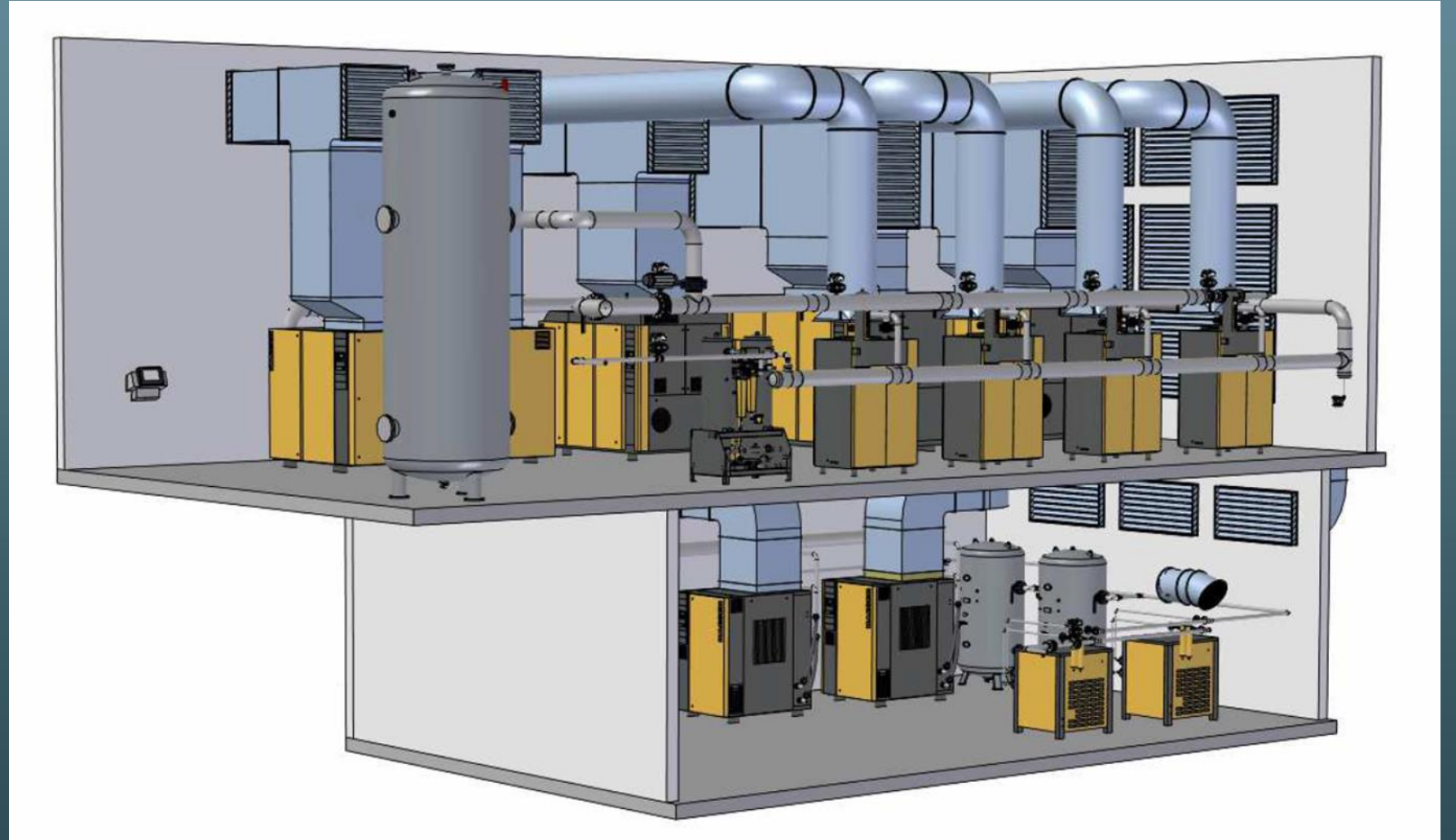


Compressed Air Station - SIGMA AIR MANAGER 4.0

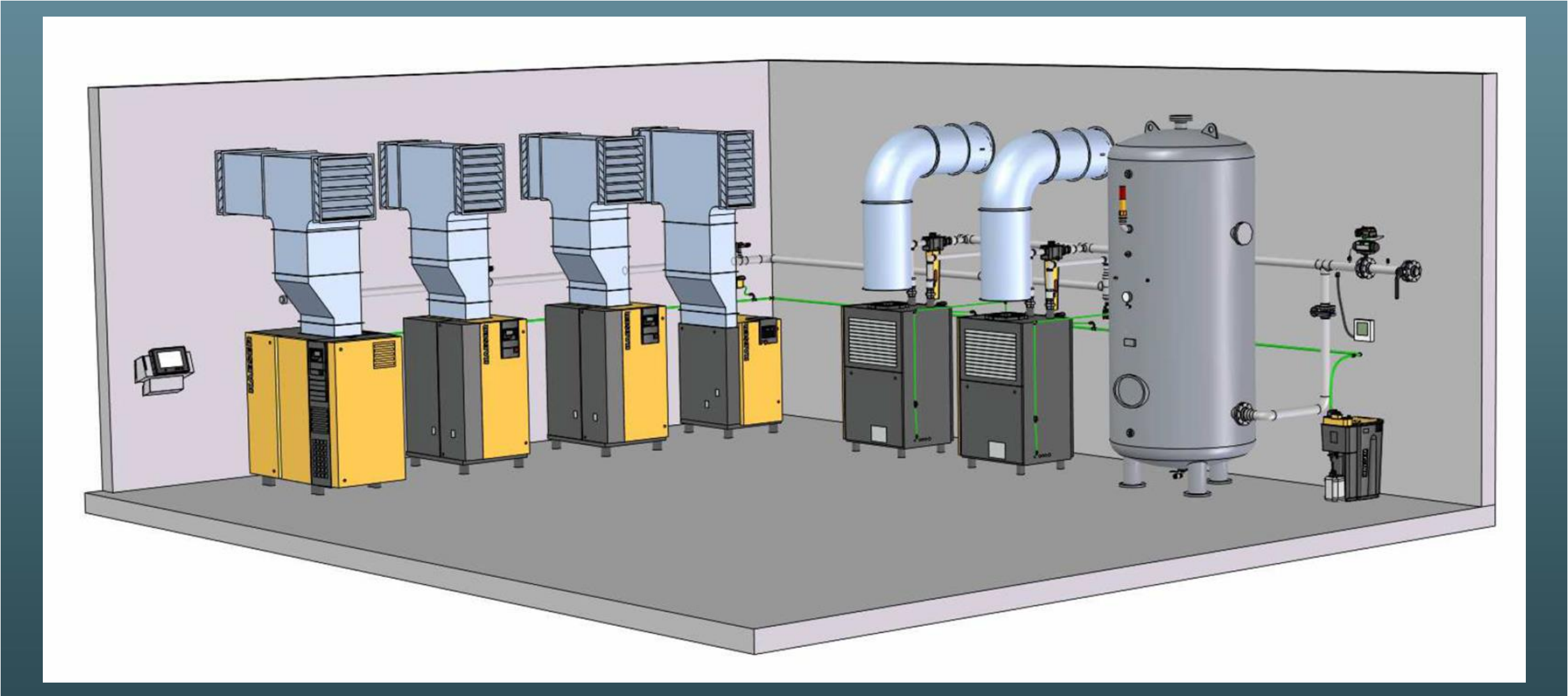


Low Pressure Station
Screw Compressors
with Fluid Cooling

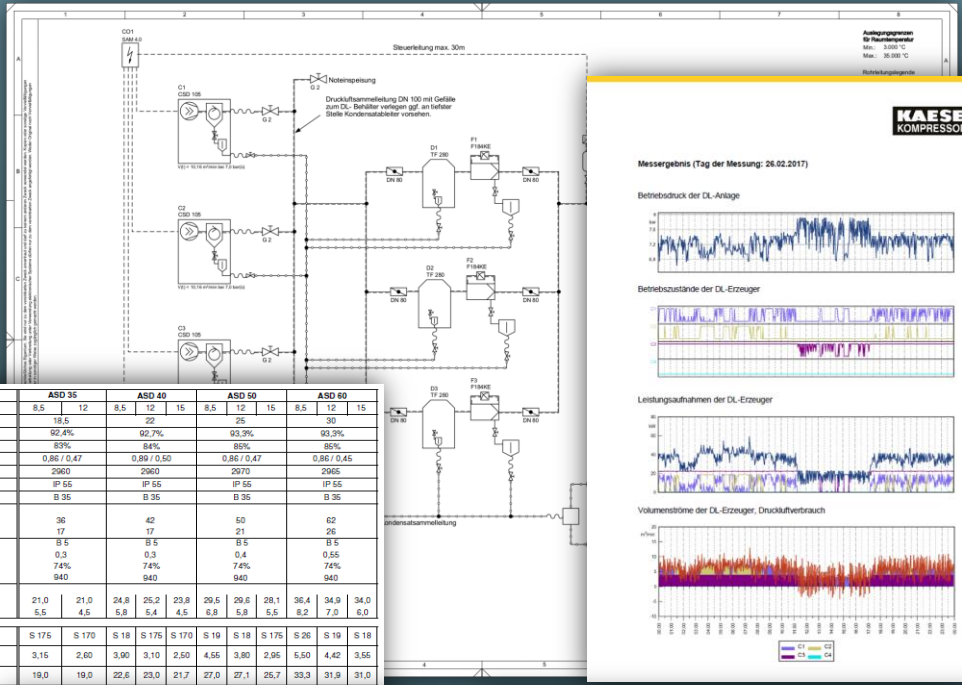
High Pressure Station
High Pressure Boosters



KAESER Compressed Air Supply Station – Example



KAESER Smart Engineering – Lifecycle of a Compressed Air Station



Steuerung max. 30m

Aufgabeparameter:
Drucktemperatur:
Max.: 13.000 °C
Min.: 36.000 °C

Druckluftsammlung DN 100 mit Gefälle zum DL-Behälter verlegen ggf. an bester Stelle Kondensatabläufe vorziehen.

Netzanschl. P1 PHASE P2 PHASE P3 PHASE

Druckluftsammlung

Model	ASD 35		ASD 40		ASD 50		ASD 60	
Max. overpressure [Bar]	8,5	12	8,5	12	15	8,5	12	15
Nominal motor power [kW]	18,5	22	22	25	30	36,5	45	55
Efficiency load [B]	92,4%	92,7%	93,7%	93,9%	93,9%	93,9%	93,9%	93,9%
Efficiency off-load	83%	84%	85%	85%	85%	85%	85%	85%
cos phi load / off-load	0,88 / 0,47	0,89 / 0,50	0,86 / 0,47	0,86 / 0,45	0,86 / 0,45	0,86 / 0,45	0,86 / 0,45	0,86 / 0,45
Motor speed [rpm]	2960	2960	2970	2965	2965	2965	2965	2965
Protecting class	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55
Frame construction	B 35	B 35	B 35	B 35	B 35	B 35	B 35	B 35
Current input unit appr. [A]								
400V/50Hz load	36	42	50	62	62	74	89	109
400V/50Hz off-load	17	17	21	26	26	31	37	45
Sep. wmt. motor:	B 5	B 5	B 5	B 5	B 5	B 5	B 5	B 5
Shaft power [kW]	0,3	0,3	0,4	0,55	0,55	0,55	0,55	0,55
Efficiency	74%	74%	74%	74%	74%	74%	74%	74%
Speed [rpm]	940	940	940	940	940	940	940	940
Unit power input								
Load [kW]	21,0	21,0	24,8	25,2	29,8	29,8	36,4	34,0
Off-load [kW]	5,5	4,5	5,8	5,4	4,5	5,8	5,5	7,0
Drive: direct	S 175	S 170	S 18	S 175	S 170	S 19	S 18	S 26
Sigma aimed	S 175	S 170	S 18	S 175	S 170	S 19	S 18	S 26
Free air delivery at max. pressure [l/min]	3,15	2,60	3,90	3,10	2,50	3,80	2,95	5,50
Compressor shaft power at max. pressure [kW]	19,0	19,0	22,6	23,0	21,7	27,0	27,1	25,7
Compressor shaft power at max. pressure [kW]	19,0	19,0	22,6	23,0	21,7	27,0	27,1	25,7
Specific power at max. pressure [kW/(m ³ /min)] [1]	6,04	7,30	5,79	7,44	8,64	7,10	9,20	4,64
Compressor shaft power off-load [kW]	5,5	4,5	5,8	5,4	4,5	5,8	5,5	7,0
Installed oil-air separator [ltr.]								
Total oil charge [ltr.]								
Air line connection [C]								

1. Volume flow related to ambient temp. 20°C, air pressure 980 mbar and compressor operating pressure 7 bar(g)

Pressure drop at ambient temp. 20°C, compressed air inlet temp. 30°C 100% r.h. and operating pressure 7 bar(g)

Pressure loss [bar]

Max. operating pressure [bar]

Max. ambient temperature [°C]

Compressed air condensation [l]

Max. ambient temperature [°C]

Max. compressed air inlet temperature [°C]

Max. elevation of the site above sea level (other site elevations only after reference to the manufacturer) [m]

2. refrigerant system

contains fluorinated greenhouse gases covered by the Kyoto Protocol

Refrigerant: R290

Natural gas fill volume [kg]

CO2 equivalent [kg]

Maximum operating pressure [bar]

Service connection (refrigerant valve) [mm]

3. Sound pressure level

Max. sound level according to DIN ISO 7243 [dB(A)]

Cooling air volume [m³/h]

Condensate volume under nominal conditions [l/h]

Dimensions BxTxH [mm]

Package weight [kg]

Condensate drain

Condensate drain user's connection

4. Safety pressure switch

Switching point: OFF

Thermoswitch

Regulates pressure drop at [bar]

5. Main voltage

Power consumption 100% [kW]

Power consumption 10% [kW]

Max. power consumption [kW]

Max. current consumption [A]

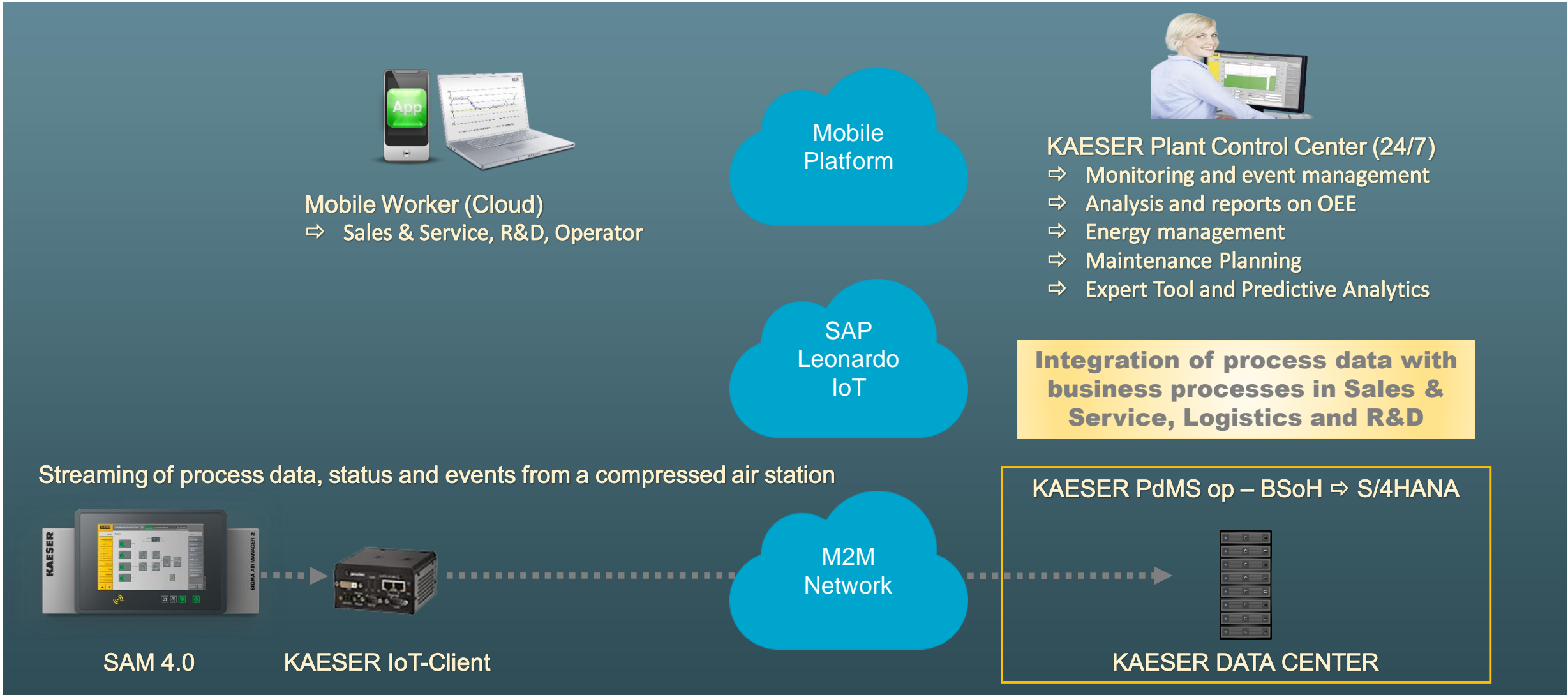
Max. mains fusing [A]

Protective earth connection (for multi strand) [mm²]

Protective class (control cabinet) [IP]

- Acquisition
 - As-is & air demand analysis
- Planning
 - Solution planning, simulation & documentation
 - Solution proposal
- Realization
 - ATP, MTO, ETO, ..., Installation (Sub-Contracting)
- Commissioning
 - Integrate into PdMS & Service
- Operation
 - Run Predictive Maintenance & Service
- Decommissioning

KAESER SIGMA SMART AIR - Architecture



Karte

Objekt-Explorer

Technische Objekte (44)

ID	Stations-Bezeichnung	Gesundheits-Status	Minimaler Reserveg	Kleinste Dauer	Prognostiziertes Datum	Spezifische Leistung	Druckgüte	ID
900000002	STATION ...	2	12.83	-94	16.04.2017			
900000016	STATION ...	5	0.00	748	07.07.2017			
900000020	STATION 2	5	47.25	843	29.04.2017			
900000001	STATION 1	1	42.28	874	22.10.2017			
900000039	STATION ...	5	0.00	1273	04.07.2017			
900000028	STATION ...	5	0.00	2827	06.11.2018			

KAESER KOMPRESSOREN

Station 2

Stationsübersicht

Selektierter Zeitraum: 01.04.17 - 18.04.17

Last- Leerlauf Verhalten in h 83% (Leerlaufstunden) / 17% (Laststunden)	Energieverbrauch in kWh 5,031.59	Energiekosten in EUR 618.89	Spezifischer Wert in kW / (m³/min) 6.35	Netzdruck Durchschnitt in bar 6.39
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Reservegrad in % | [Report exportieren](#) | [Zurück zum KPCC](#) | [Zurück zum KSAM](#)

KAESER KOMPRESSOREN

Energiekosten

Strompreis als Kalkulationsbasis: 0,1236/kWh

Energiekosten Gesamt	Energiekosten Lastlauf	Energiekosten Leerlauf
618.89	540.24	78.64

KAESER KOMPRESSOREN

Energieverbrauch

Energieverbrauch Gesamt	Energieverbrauch Lastlauf	Energieverbrauch Leerlauf
5,031.59	4,392.18	639.41

KAESER KOMPRESSOREN

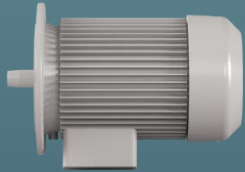
Reservegrad

Selektierter Zeitraum: 06.04.17 - 18.04.17

Monitoring - Spezifische Leistung

KAESER Smart Asset Management – Track & Trace

Supplier



- ⇒ Material-Serial-Number (component)
- ⇒ Technical Documentation
- ⇒ Manuals
- ⇒ Spare Parts Lists
- ⇒ Certificates



KAESER Product



- ⇒ Material-Serial-Number (final product)
- ⇒ Equipment list
- ⇒ Final inspection data



iBase



KAESER Smart Asset Management – Compressed Air Station Lifecycle

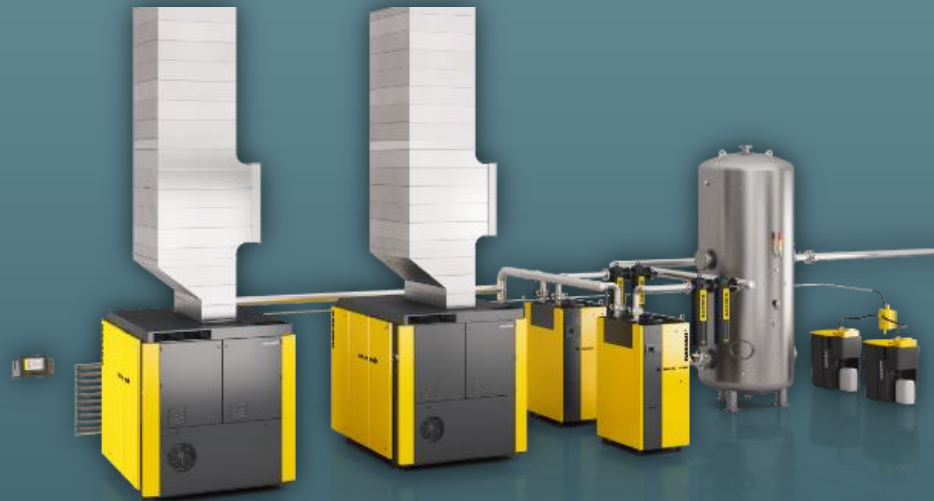


Complementary Equipment

Engineered Components

Installation by Sub-Contractor

Maintenance, Repair and Operations



Partners
Distributors
OEM's
EPCC's
Operators

Acquisition

Planning

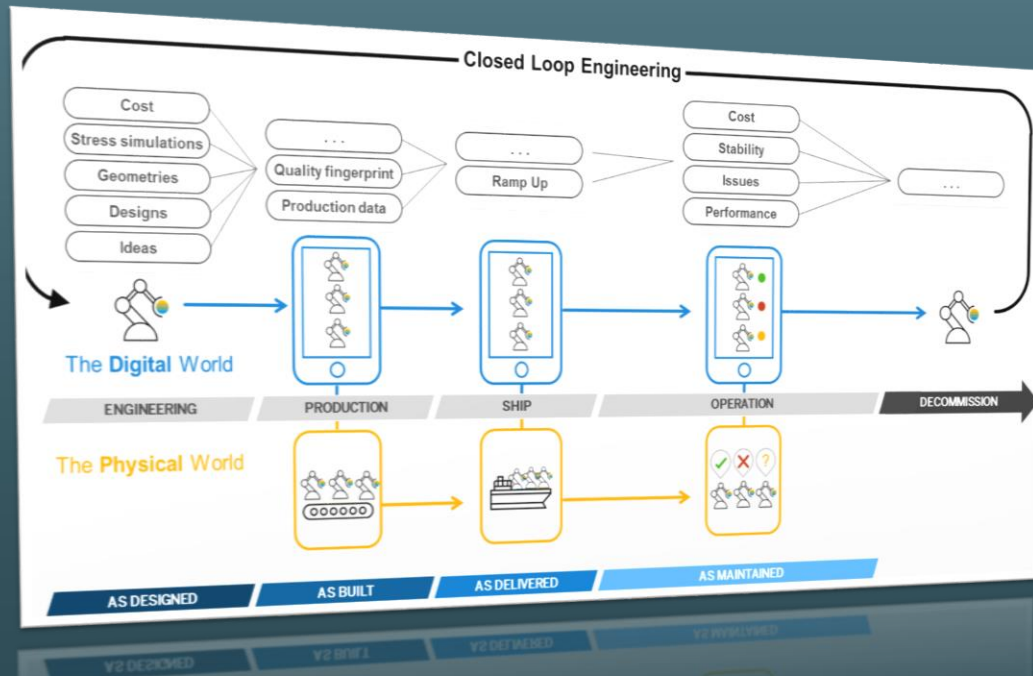
Realization

Commissioning

Operation

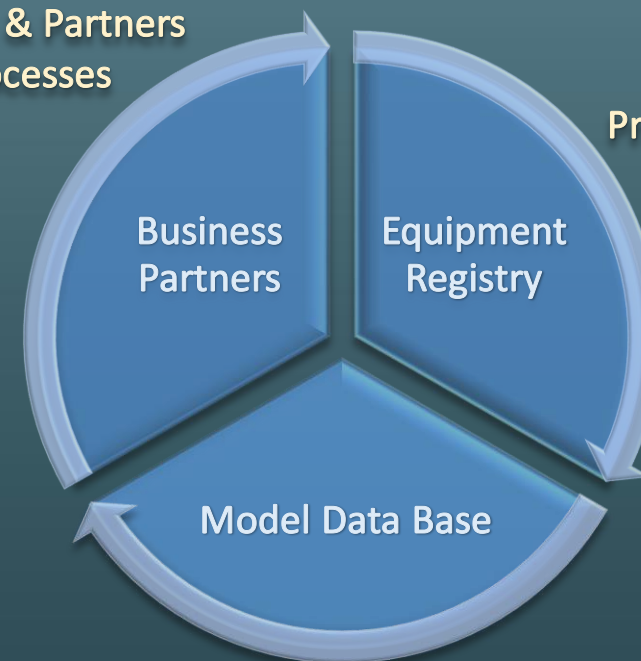
Decommissioning

KAESER Smart Asset Management



Customers & Partners
Service Processes
Reporting

Kaeser
Service Processes
Product Improvement



5. Operations

- Maintenance services
- Calibration services
- Performance as a service
- ...

4. Commissioning

- Commissioning services
- ...

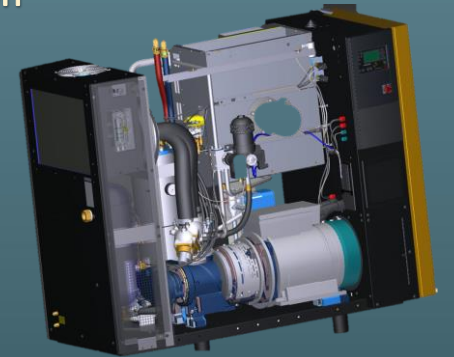


1. Engineering

- Engineering services
- 3D model conversion
- ...

2. Procurement

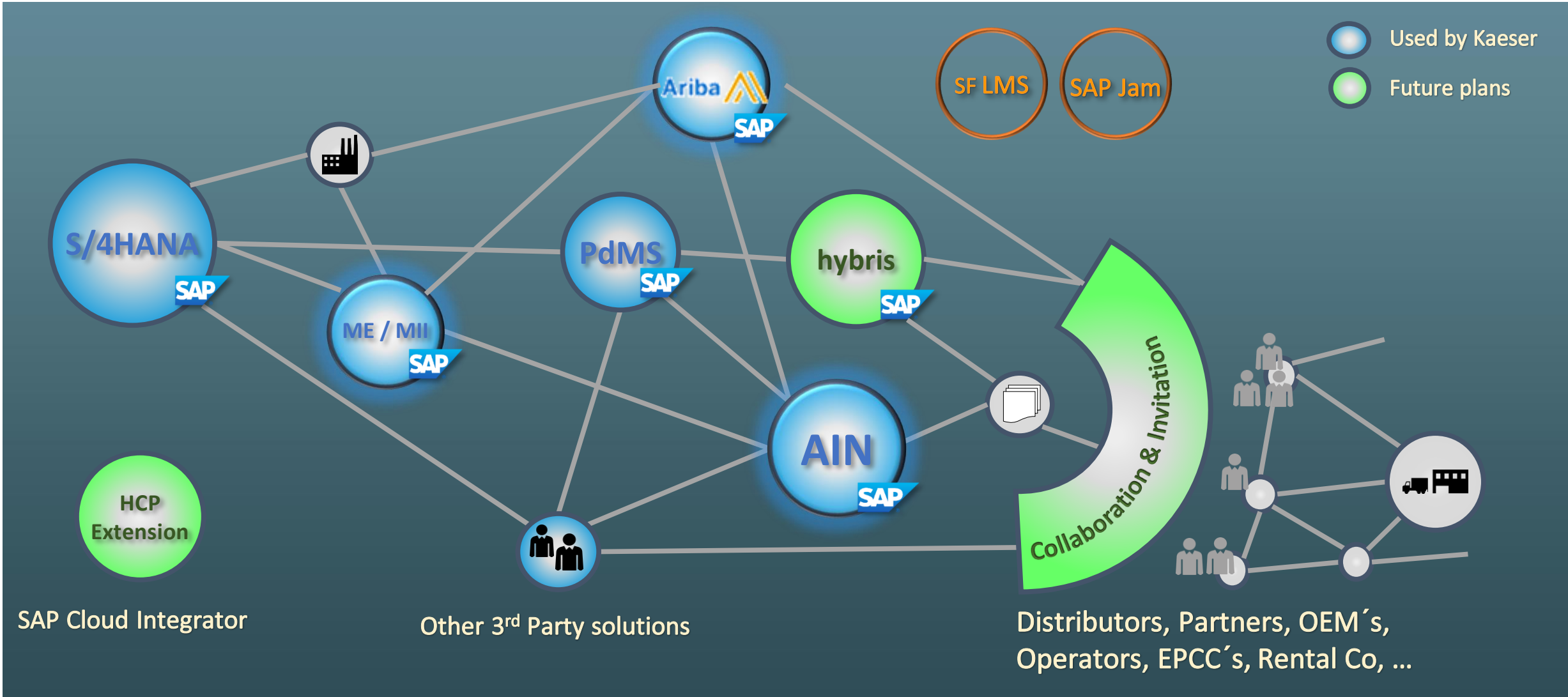
- E-Procurement services
- Digital twin as USP
- ...



3. Installation

- Machine fingerprint, Installation certification, ...

Connect the Dots and Go for Operational Excellence



KAESER SIGMA SMART AIR

Projectable

- KAESER is responsible for operations & maintenance of the compressed air station
- Service Level Agreements for the production of compressed air
- Monthly settlement based on consumption of compressed air

Improve Overall Equipment Effectiveness (OEE)

Effective

- Avoid planned and unplanned downtime – High Availability
- Improve energy efficiency
- Reduce service costs by optimized maintenance and eliminating incidents

Consulting

Intelligent

- Adapt compressed air station to changing customer demand during the the life cycle

