

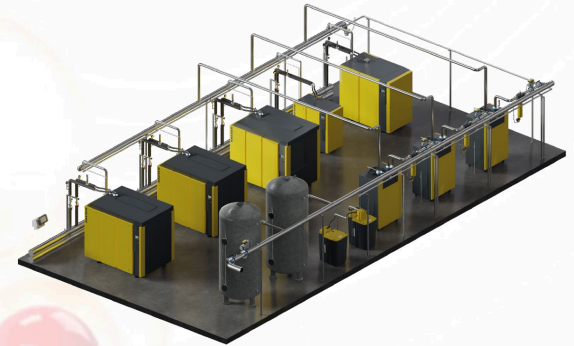
Sample Report

KESS Report

17/05/24 SAM download. Compressors in local control

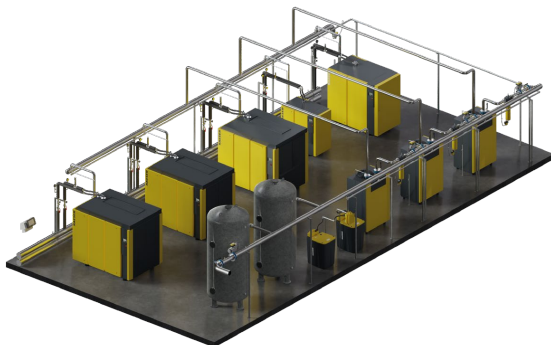
KESS 4.0 Report

Energy efficient compressed air solutions
by KAESER Kompressoren



KESS 4.0 Report

Contents



Requirements analysis



Compressed air consumption



System comparison



System description



Requirements analysis

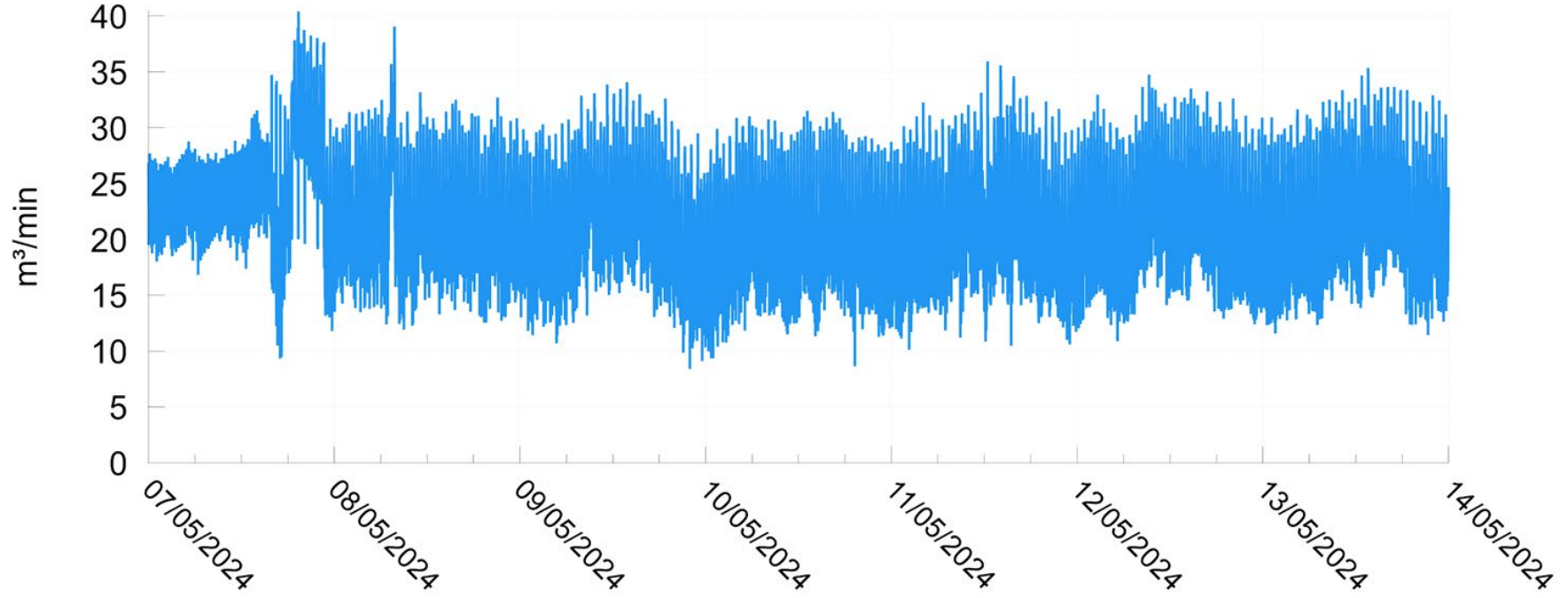
Scope conditions

Analysis Period	07/05/2024, Tu 00:00 ⇒ 14/05/2024, Tu 00:00
Working weeks per year	50 weeks
Projected annual consumption of compressed air	11,097,414 m ³
Electricity price	0.22 £/kWh
CO ₂ emission factor	225 g/kWh
Maximum allowed pressure	8.50 bar(g)
Minimum required pressure	6.10 bar(g)



Compressed air consumption

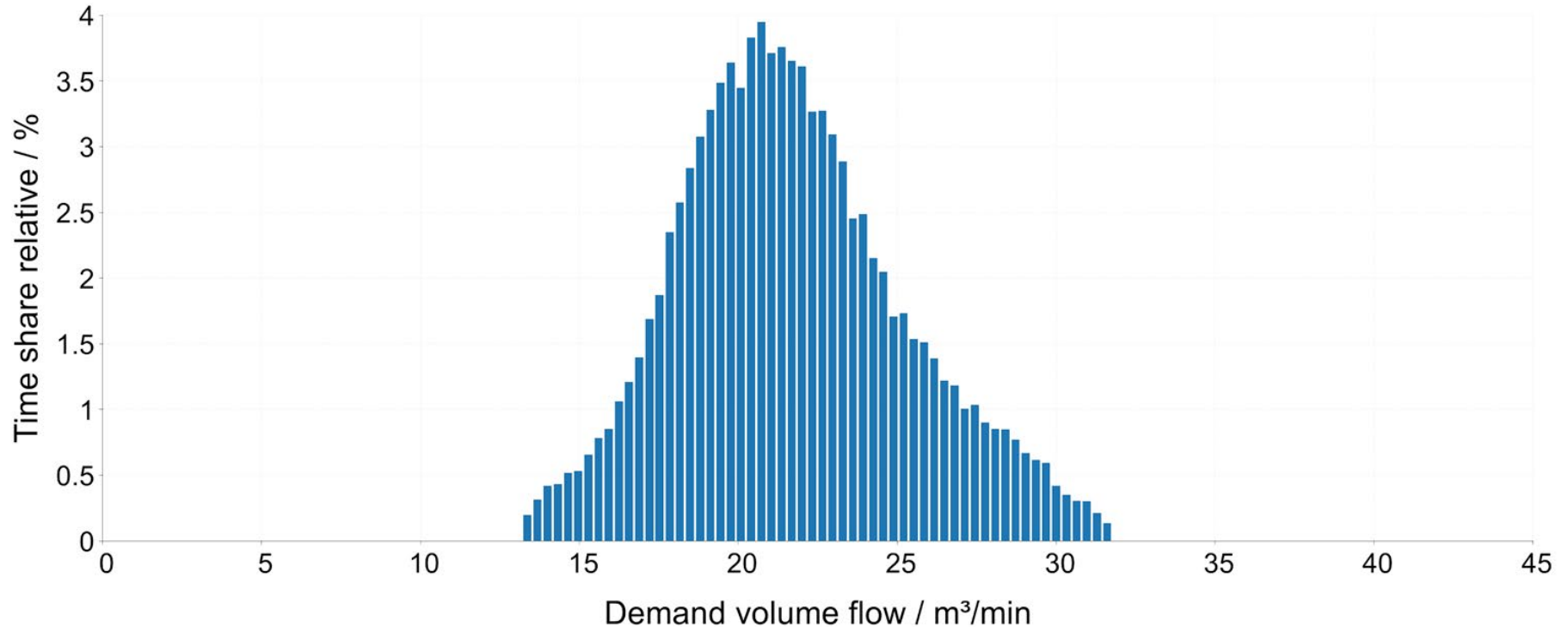
Volume flow during analysis period - 07/05/2024 - 13/05/2024





Compressed air consumption

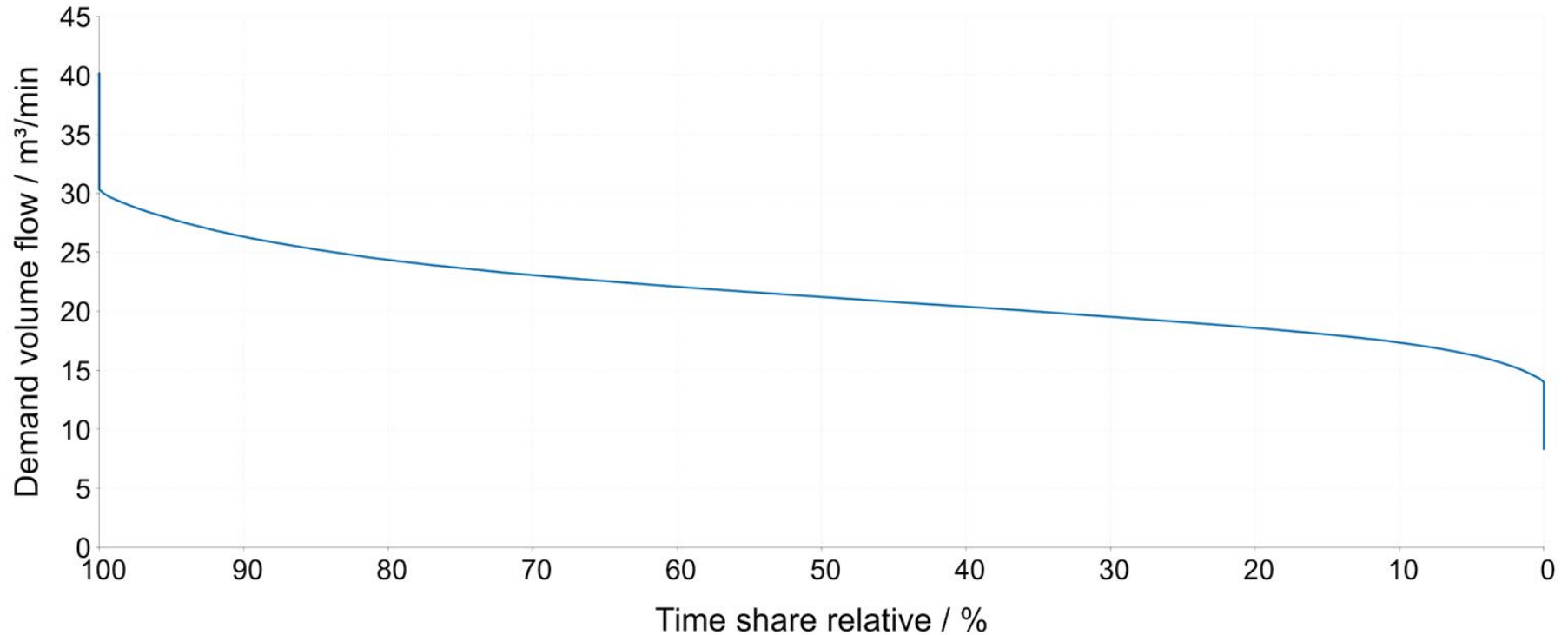
Volume flow distribution during analysis period





Compressed air consumption

Volume flow distribution during analysis period





Solution comparison

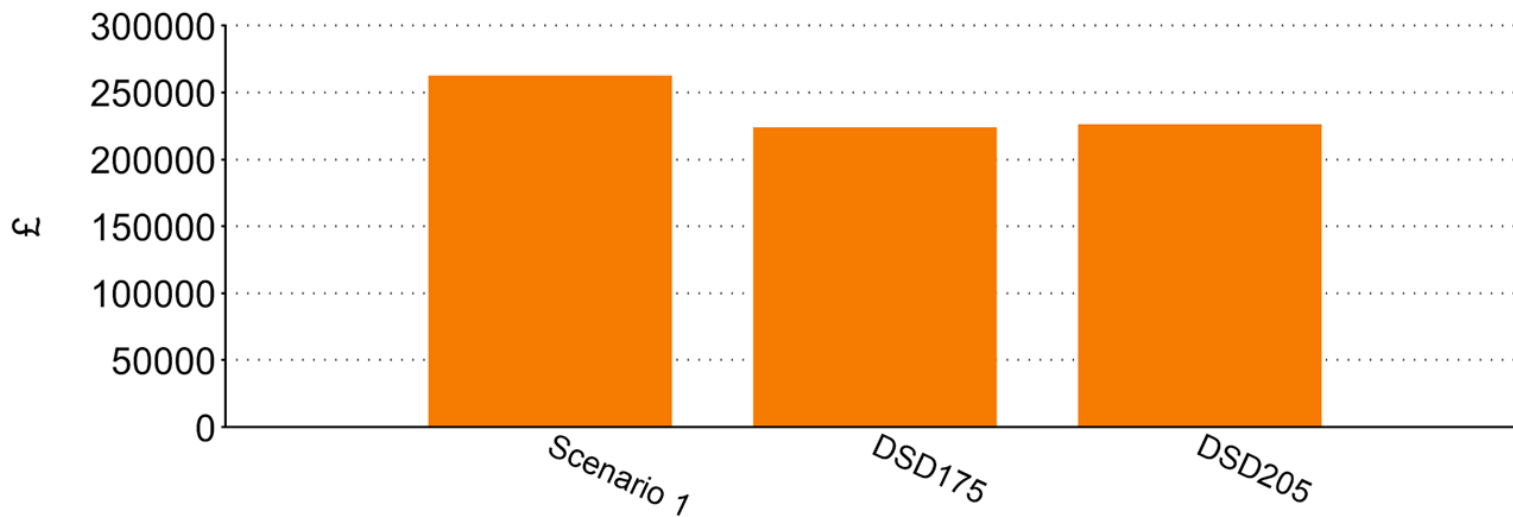
Table

Scenario			FAD	V _{Eff}	Differential pressure across air treatment	Control	E _Σ	Energy costs	CO ₂	P _{Spec}
			m³/min	m³	bar		kWh	£	t	kW/(m³/min)
Scenario 1	☒	☐	32.57	14.7	0.0		1,193,911	262,660	268.6	6.46
DSD175	☒	☐	49.37	14.7	0.0	A3D	1,018,229	224,010	229.1	5.51
DSD205	☒	☐	53.39	14.7	0.0	A3D	1,028,281	226,222	231.4	5.56



Solution comparison

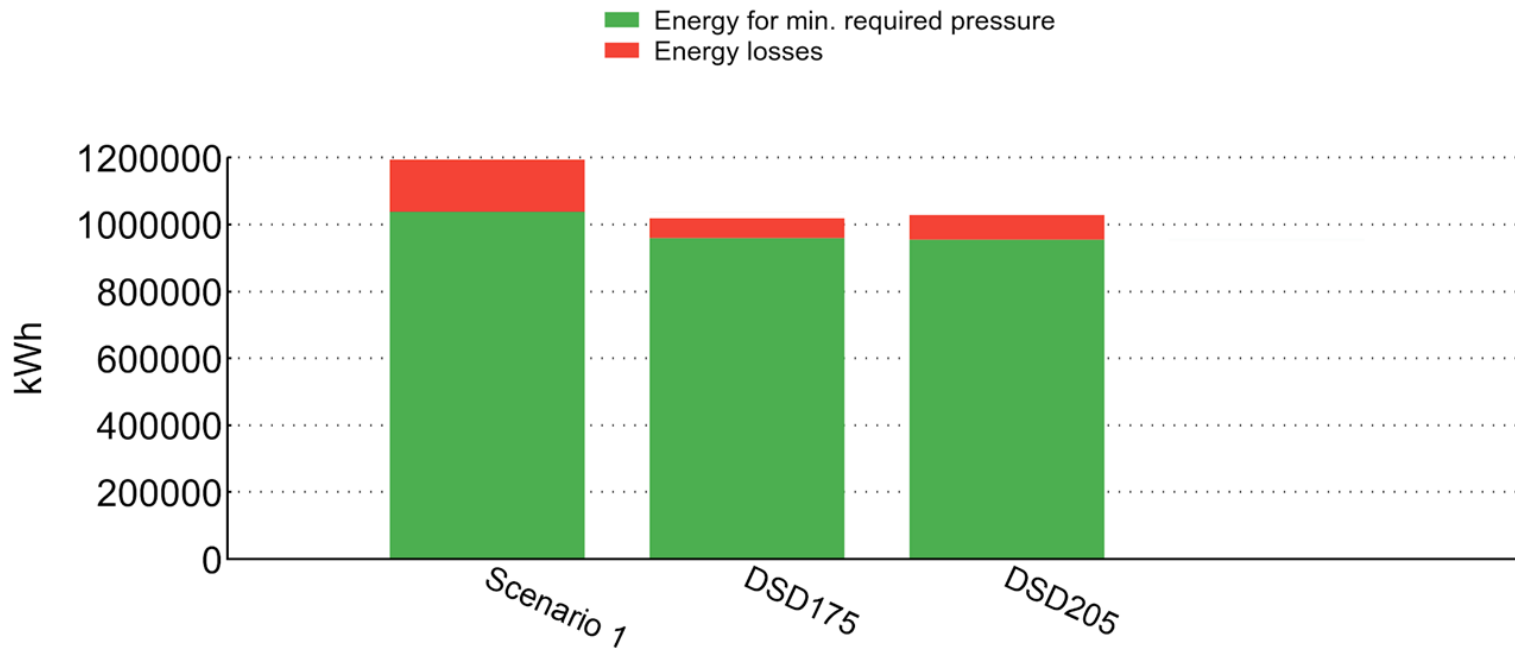
Energy costs





Solution comparison

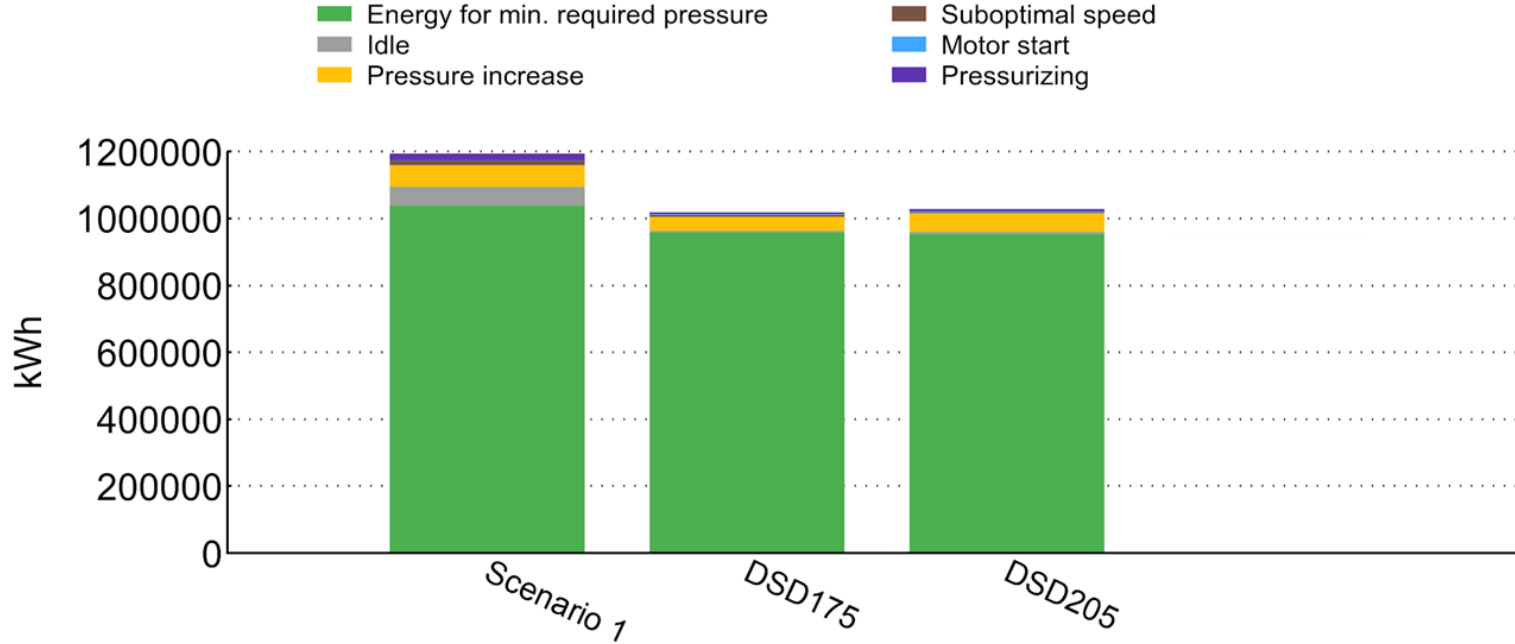
Energy overview





Solution comparison

Energy distribution





System description

Scenario 1

Process flow diagram





System description

Scenario 1

Max. delivery volume flow at max. pressure	32.57	m ³ /min
Effective buffer volume	14.69	m ³
Differential pressure via treatment	0.00	bar
Control method		
With variable speed compressors		☒
With water cooled compressors		☐

Import from ADA 4.0



El. energy consumption per year	1,193,911 kWh
El. energy costs per year	262,660 £
CO ₂ equivalent per year	268.6 t
Specific power	6.46 kW/(m ³ /min)
Energy savings per year	0 kWh
Energy costs savings per year	0 £



System description

Existing System

Utilized compressors - Datasheet values

	Manufacturer	Sales type	YOP	p_{Max}	$P @ p_{Max}$	FAD @ p_{Max}	$P_{Spec} @ p_{Max}$	P_{Idle}
				bar(g)	kW	m ³ /min	kW/(m ³ /min)	kW
C1	KAESER	CSDX 165		8.50	105.20	16.10	6.534	23.80
C2	KAESER	BSD 75		8.50	45.20	6.97	6.485	10.40
C3	KAESER	CSD 105 SFC		8.50	63.00	9.50	6.632	5.50



System description

Existing System

Utilized compressors - Simulation values

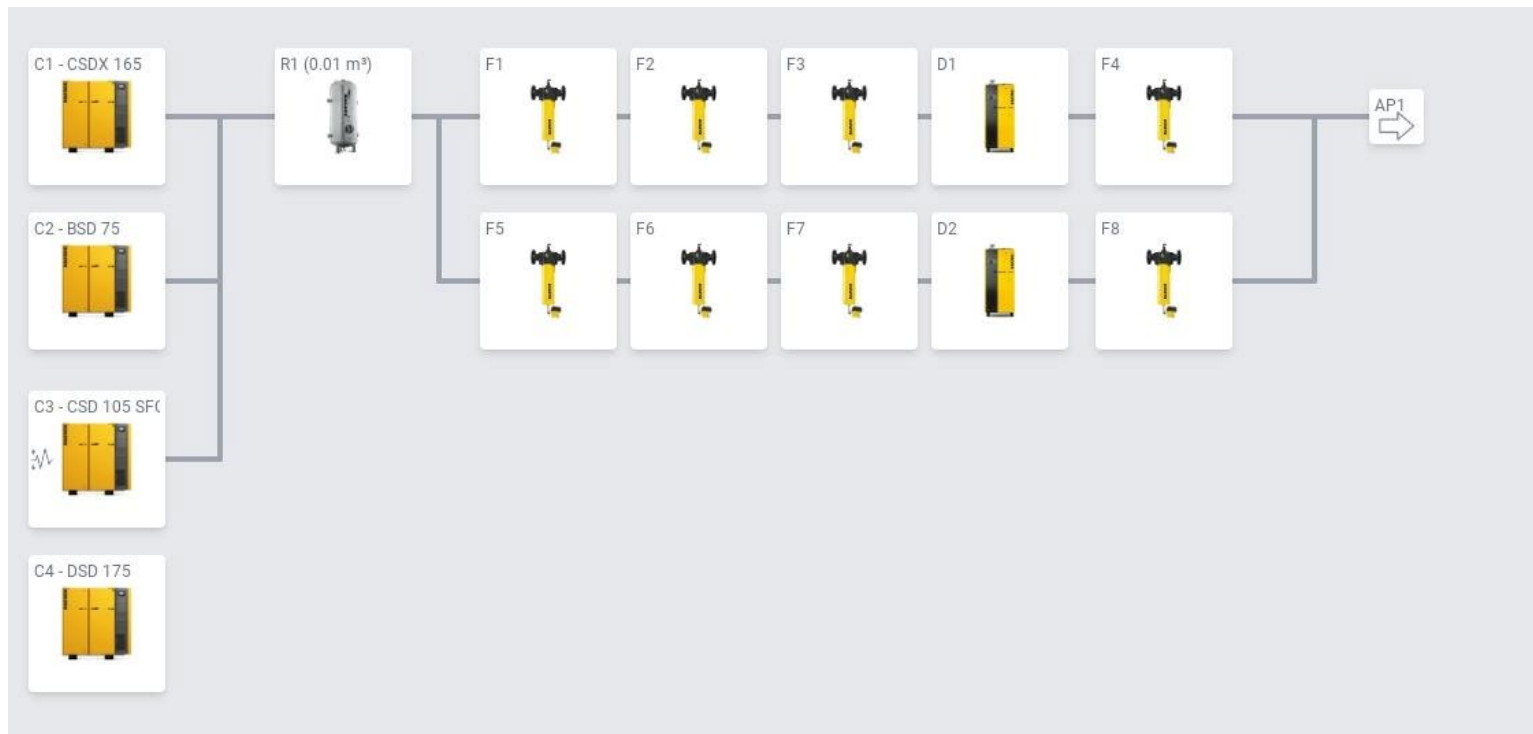
	Manufacturer	Sales type	YOP	t _{Load}	t _{Idle}	Load energy	Idle energy	Total energy	Delivered volume	P _{Spec}
				h	h	kWh	kWh	kWh	m ³	kW/(m ³ /min)
C1	KAESER	CSDX 165		5,928	2,354	578,764	76,502	655,267	5,755,747	6.83
C2	KAESER	BSD 75		3,333	67	137,718	1,034	138,752	1,403,403	5.93
C3	KAESER	CSD 105 SFC		8,394	2	399,855	37	399,892	3,923,677	6.12



System description

DSD175

Process flow diagram



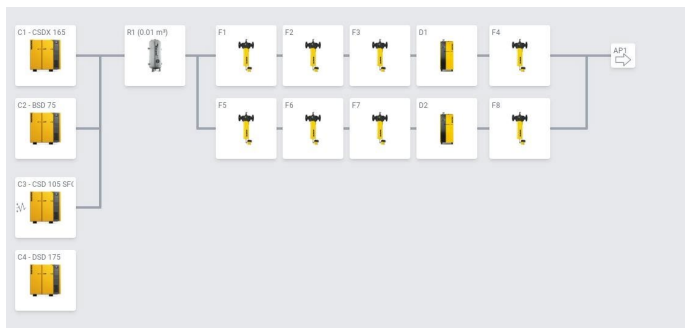


System description

DSD175

Max. delivery volume flow at max. pressure	49.37	m ³ /min
Effective buffer volume	14.69	m ³
Differential pressure via treatment	0.00	bar
Control method	A3D	
With variable speed compressors		☒
With water cooled compressors		☐

Import from ADA 4.0



El. energy consumption per year	1,018,229 kWh
El. energy costs per year	224,010 £
CO ₂ equivalent per year	229.1 t
Specific power	5.51 kW/(m ³ /min)
Energy savings per year	175,681 kWh
Energy costs savings per year	38,650 £



System description

DSD175

Utilized compressors - Datasheet values

	Manufacturer	Sales type	YOP	p_{Max}	$P @ p_{Max}$	$FAD @ p_{Max}$	$P_{Spec} @ p_{Max}$	P_{Idle}
				bar(g)	kW	m³/min	kW/(m³/min)	kW
C1	KAESER	CSDX 165		8.50	105.20	16.10	6.534	23.80
C2	KAESER	BSD 75		8.50	45.20	6.97	6.485	10.40
C3	KAESER	CSD 105 SFC		8.50	63.00	9.50	6.632	5.50
C4	KAESER	DSD 175		8.50	100.20	16.80	5.964	21.20



System description

DSD175

Utilized compressors - Simulation values

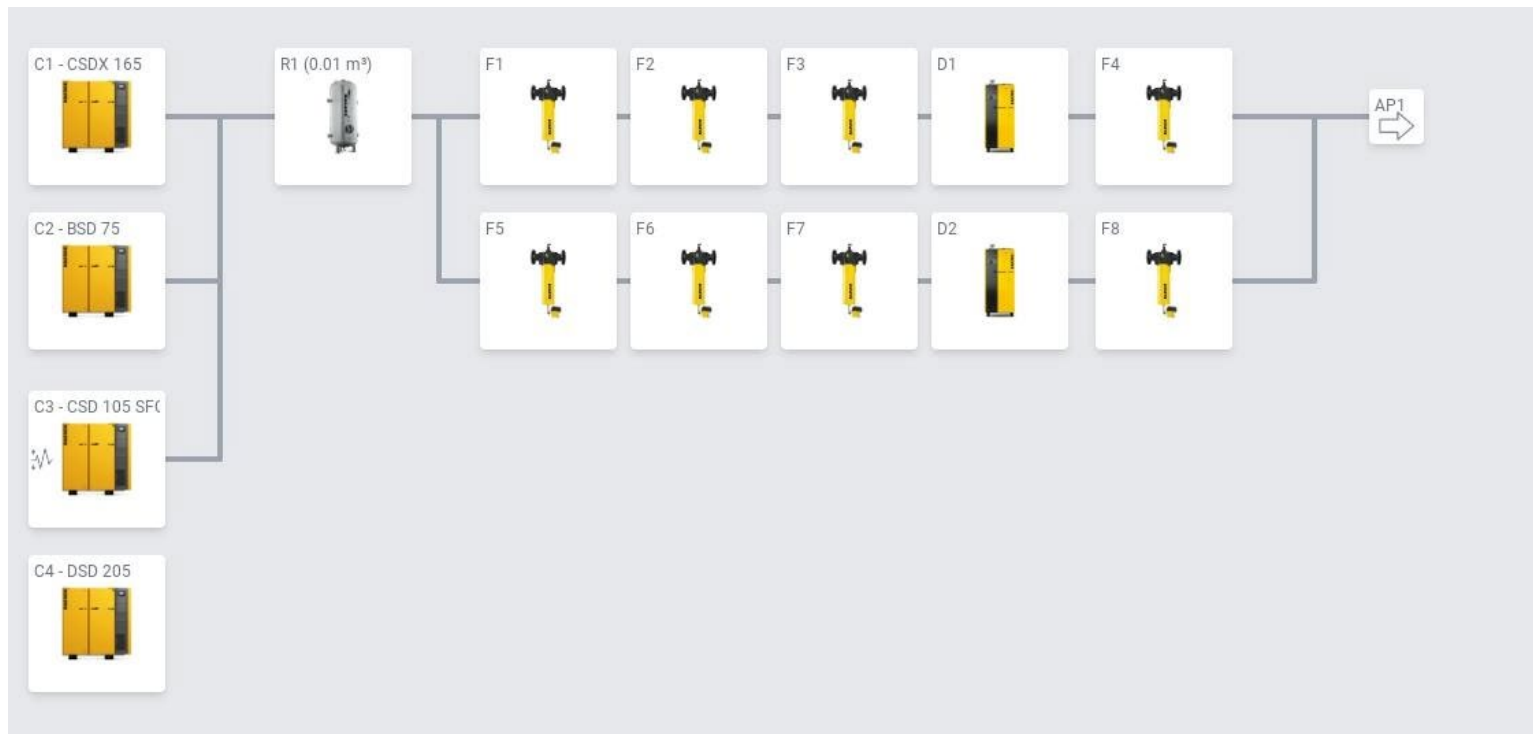
	Manufacturer	Sales type	YOP	t _{Load}	t _{Idle}	Load energy	Idle energy	Total energy	Delivered volume	P _{Spec}
				h	h	kWh	kWh	kWh	m ³	kW/(m ³ /min)
C1	KAESER	CSDX 165		60	10	5,764	350	6,114	58,105	6.31
C2	KAESER	BSD 75		1,386	286	56,669	4,515	61,184	583,878	6.29
C3	KAESER	CSD 105 SFC		6,004	437	187,997	6,651	194,648	1,894,851	6.16
C4	KAESER	DSD 175		8,389	5	756,074	209	756,283	8,560,683	5.30



System description

DSD205

Process flow diagram



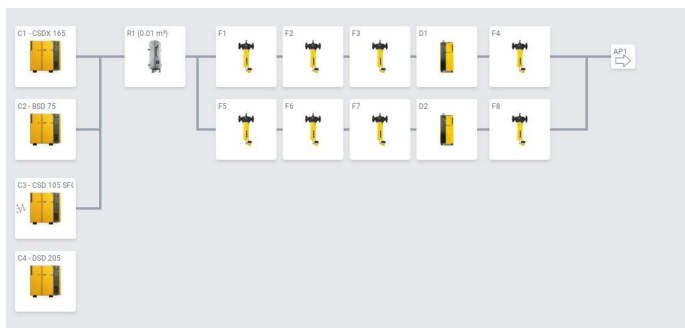


System description

DSD205

Max. delivery volume flow at max. pressure	53.39	m ³ /min
Effective buffer volume	14.69	m ³
Differential pressure via treatment	0.00	bar
Control method	A3D	
With variable speed compressors		☒
With water cooled compressors		☐

Import from ADA 4.0



El. energy consumption per year	1,028,281 kWh
El. energy costs per year	226,222 £
CO ₂ equivalent per year	231.4 t
Specific power	5.56 kW/(m³/min)
Energy savings per year	165,630 kWh
Energy costs savings per year	36,439 £



System description

DSD205

Utilized compressors - Datasheet values

	Manufacturer	Sales type	YOP	p_{Max}	$P @ p_{Max}$	FAD @ p_{Max}	$P_{Spec} @ p_{Max}$	P_{Idle}
				bar(g)	kW	m ³ /min	kW/(m ³ /min)	kW
C1	KAESER	CSDX 165		8.50	105.20	16.10	6.534	23.80
C2	KAESER	BSD 75		8.50	45.20	6.97	6.485	10.40
C3	KAESER	CSD 105 SFC		8.50	63.00	9.50	6.632	5.50
C4	KAESER	DSD 205		8.50	125.50	20.82	6.028	26.80



System description

DSD205

Utilized compressors - Simulation values

	Manufacturer	Sales type	YOP	t _{Load}	t _{Idle}	Load energy	Idle energy	Total energy	Delivered volume	P _{Spec}
				h	h	kWh	kWh	kWh	m ³	kW/(m ³ /min)
C1	KAESER	CSDX 165		35	5	3,369	195	3,564	34,404	6.22
C2	KAESER	BSD 75		403	142	16,498	2,269	18,767	169,867	6.63
C3	KAESER	CSD 105 SFC		2,425	471	68,839	6,697	75,535	687,369	6.59
C4	KAESER	DSD 205		8,055	149	923,763	6,651	930,414	10,205,914	5.47



Legend

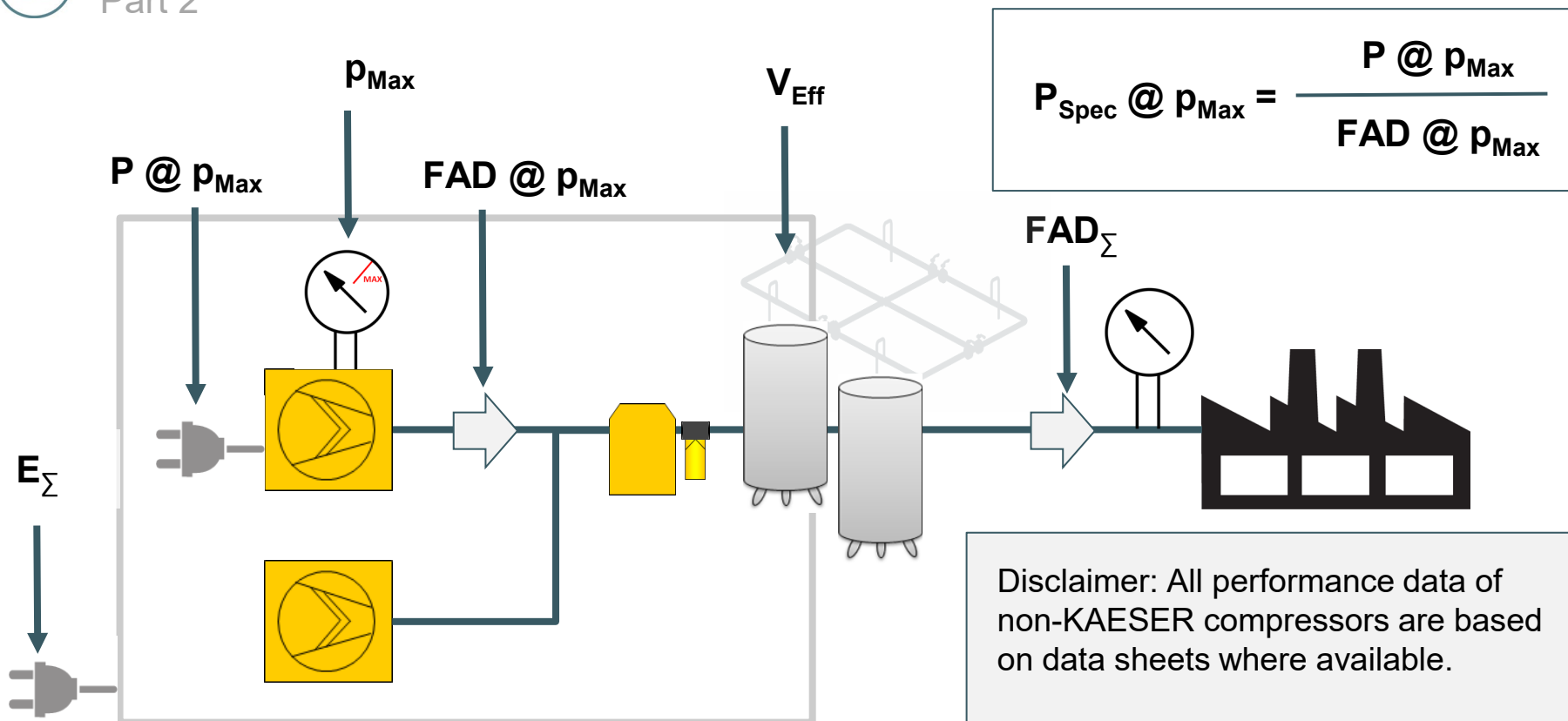
Part 1

p_{Max}	Maximum pressure on which a compressor can be operated
$P @ p_{Max}$	Electrical power consumption of a complete compressor during load at p_{Max}
$FAD @ p_{Max}$	Delivery volume flow of a compressor at p_{Max}
$P_{Spec} @ p_{Max}$	Specific power consumption of a compressor at p_{Max}
P_{Idle}	Electrical power consumption of a complete compressor during idling.
t_{Load}	Load time of a compressor
t_{Idle}	Idle time of a compressor
	The scenario has at least one compressor with variable speed
	The scenario has at least one compressor with water cooling
FAD_{Σ}	Total delivery volume flow of a considered compressed air station
V_{Eff}	Effective buffer volume of a considered compressed air station
E_{Σ}	Total electrical energy consumption of all compressors in a station calculated up on one year
P_{Spec}	Specific power of compressed air generation



Legend

Part 2



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