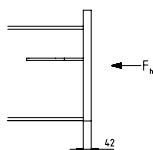


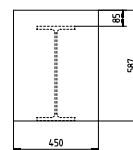
Ⓒ Ⓓ Ⓔ Ⓕ

No. of Cyl.	Turbocharger type	CrankshaftParts	HP-SCR Interface	A	B	C	D	E*	F*	M	H
6	ON REQUEST										
7	2 x MET83MB	1	Without	795	855	1879	1301	-	-	6175	8175
8	2 x MET83MB	1	Without	855	855	795	1301	-	-	6175	8175
	2 x MET83MB	2	Without	855	892	795	1412	-	-	6175	8175
9	2 x MET71MB	2	Without	855	892	795	1412	-	-	6175	8175
	2 x A280_L	2	With	855	892	795	906	-	-	6175	8175
	3 x A175_L	2	Without	795	892	1579	1712	-	-	6175	8175
10	3 x MET66MB	2	Without	795	892	1879	1412	-	-	6175	8175
	3 x MET83MB	2	Without	795	892	1879	1412	-	-	6175	8175
	3 x MET71MB	2	Without	795	892	1879	1412	-	-	6175	8175
11	3 x MET71MB	2	Without	795	892	1879	1412	5565	4086	6175	8175
12	3 x MET71MB	2	Without	795	892	1879	3076	5565	5750	6175	8175
	3 x MET83MB	2	Without	795	892	1879	3076	5565	5750	6175	8175
	3 x A275	2	Without	795	892	1879	3076	5565	5750	6175	8175

(F) VIEW C
SCALE 1:10

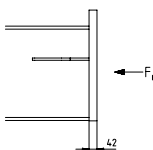


(F) VIEW D
SCALE 1:10

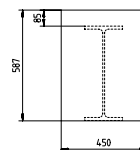


Max. permissible force in lateral direction	F_h (kN)	± 200
Stiffness	k (N/m)	0.6×10^9
Permissible vertical stays displacement	Def_v (mm)	± 50
Permissible horizontal stays displacement	Def_h (mm)	± 50
Permissible angular stays displacement	Def_a (°)	2

VIEW A
(F) SCALE 1:10



VIEW B
SCALE 1:10



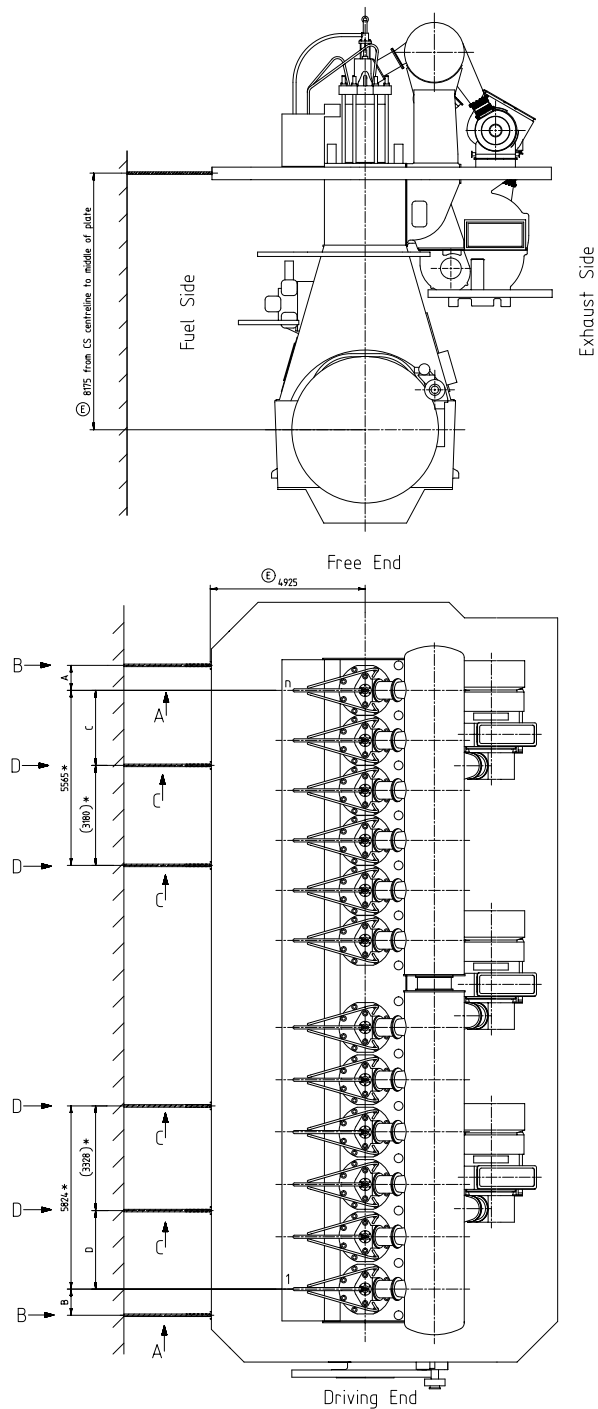
Max. permissible force in lateral direction	F_h	(kN)	± 200
Stiffness	k	(N/m)	0.6×10^9
Permissible vertical stays displacement	Def_v	(mm)	± 50
Permissible horizontal stays displacement	Def_h	(mm)	± 50
Permissible angular stays displacement	Def_a	(°)	2

- The installation and commissioning of the stays must be in accordance with the supplier's instructions.

Max. force acting on ship's hull	$F_{h_{\max}}$ (kN)	*1)
Minimum stiffness	k_{\min} (N/m)	0.5×10^9
Permissible deflection per 100 kN	Def_{\max} (mm)	0.2

*1) Maximum engine force resulting from lateral moments of X/H type at the project specific rating plus stays pre-tensioning force according to stays supplier's specification

[illegible]



* Only for 11 and 12 cylinders.

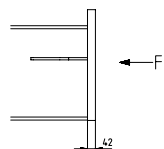
③ Position of stay attachment points on engine / platform side

No. of Cyl.	CrankshaftParts	A	B	C	D
6	ON REQUEST				
7	1	795	795	2385	2385
8	1	795	795	2385	2385
8	2	795	832	2385	2496
9	2	795	832	2385	2496
10	2	795	832	2385	2496
11	2	795	832	2385	2496
12	2	795	832	2385	2496

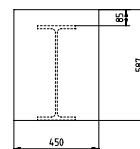
③
③
③

Layout / Specification of "inner" stay platform attachment points

③ VIEW C
SCALE 1:10



③ VIEW D
SCALE 1:10

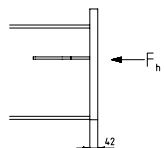


③

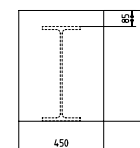
Max. permissible force in lateral direction	F_h	(kN)	± 200
Stiffness	k	(N/m)	0.6×10^4
Permissible vertical stays displacement	Def_v	(mm)	± 50
Permissible horizontal stays displacement	Def_h	(mm)	± 50
Permissible angular stays displacement	Def_a	(°)	2

Layout / Specification of "outer" stay platform attachment points

③ VIEW A
SCALE 1:10



③ VIEW B
SCALE 1:10



③

Max. permissible force in lateral direction	F_h	(kN)	± 200
Stiffness	k	(N/m)	0.6×10^4
Permissible vertical stays displacement	Def_v	(mm)	± 50
Permissible horizontal stays displacement	Def_h	(mm)	± 50
Permissible angular stays displacement	Def_a	(°)	2

⑤ Requirements for application of hydraulic stays on fuel side

- The selected stays must have maker's acceptance for one side engine installation.
WinGD approved supplier : Green & Clean Technology Co., Ltd (Korea)
Hanmi Hydraulic Machinery Co., Ltd (Korea)
Nantong Navigation Machinery Group Co., Ltd (China)

- Installed on fuel side (FS).

- The amount of stays must be determined based on the requirement and stays suppliers specification. The transferred forces must be taken into consideration. The engine forces and moments are defined in the relevant engine dynamic data sheet "Forces and Moments" which is linked in the Marine Installation Manual (MIM). Stay pre-tensioning forces (max. piston hydraulic force) must also be considered and are provided by the stays supplier.

- The stay attachment point requirements must be crosschecked with the specification. The maximum forces transferred by the selected stays type must be within the range as defined on this drawing for standard engine execution. If the total force per stay exceeds the permissible range, reinforcement of the platform attachment points can be requested from the engine builder.

- The stays must adapt to the ship hull deformation and reduce the static reaction force acting on the engine and ship hull attachment points.

- The stays must increase the total stiffness of the system to avoid harmful resonance conditions. The dynamic stiffness of the stays (dynamic spring rate) is provided by the stays supplier.

- The stays must dampen accordingly to ensure that the acceptable vibrations (RMS limits) for the WinGD 2-stroke engine are met.

- The performance of the stays must be checked during sea trial by vibration measurements.

- Stay position in the vertical direction, respectively the distance to the bottom side of the upper platform beam must be arranged in a way that sufficient space for welding and application of the max. admissible stays inclination remains.

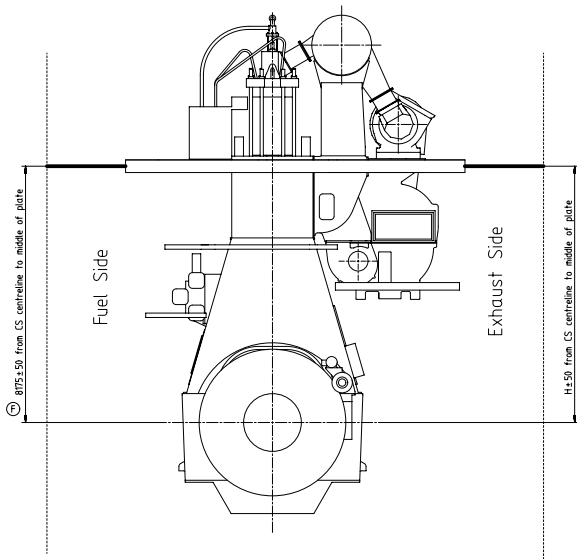
- The installation and commissioning of the stays must be in accordance with the supplier's instructions.

⑤ Requirements on stays attachment points at ship hull side (per engine stay)

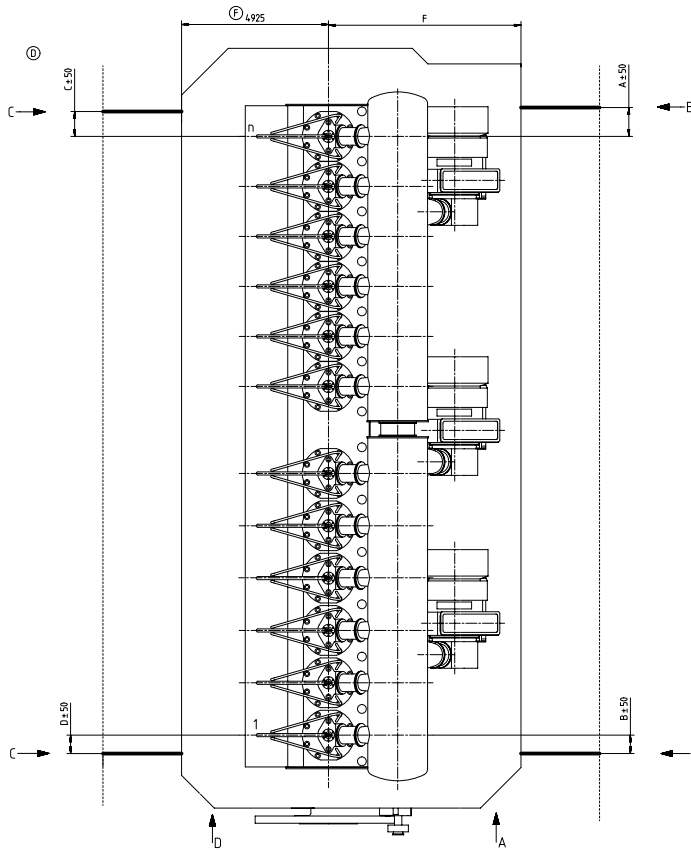
Max. force acting on ship's hull	$F_{h_{max}}$	(kN)	*1)
Minimum stiffness	k_{min}	(N/m)	0.5×10^4
Permissible deflection per 100 kN	Def_{max}	(mm)	0.2

*1) Maximum engine force resulting from lateral moments of X/H type at the project specific rating plus stays pre-tensioning force according to stays supplier's specification

E 100101		10010101	1001010101	Drawing Updated	4	1
D 100101		10010101	1001010101	Legacy information. See corresponding ChangeNotice	4	1
C 100101		10010101	1001010101	Legacy information. See corresponding ChangeNotice	4	1
B 100101		10010101	1001010101	Legacy information. See corresponding ChangeNotice	4	1
A 100101		10010101	1001010101	Legacy information. See corresponding ChangeNotice	4	1
WINGD		10010101	1001010101	ENGINE STAYS	4	1
Stays location: FS		10010101	1001010101		4	1
Scale: 1:10		10010101	1001010101		4	1
Main: 100101		10010101	1001010101		4	1
Design: 100101		10010101	1001010101		4	1
Drawn: 100101		10010101	1001010101		4	1
Checked: 100101		10010101	1001010101		4	1
Approved: 100101		10010101	1001010101		4	1
PAAD301865		10010101	1001010101		4	1



Free End

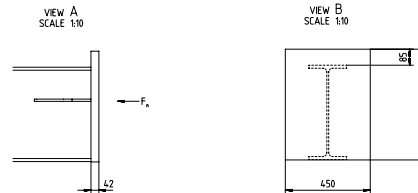


Driving End

Position of stay attachment points on engine / platform side

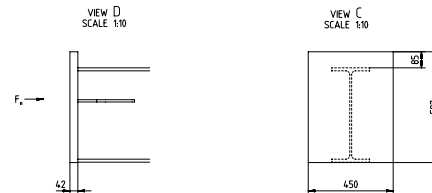
No. of Cyl.	Turbocharger type	CrankshaftParts	HP-SCR Interface	A B C D F H							
				ON REQUEST							
6											
7	2 x MET83MB	1	Without	795	855	795	795	6175	8175		
8	2 x MET83MB	1	Without	855	855	795	795	6175	8175		
	2 x MET83MB	2	Without	855	892	795	832	6175	8175		
9	2 x MET71MB	2	Without	855	892	795	832	6175	8175		
	2 x A180_L	2	With	855	892	795	832	6175	8175		
	3 x A175_L	2	Without	795	892	795	832	6175	8175		
10	3 x MET66MB	2	Without	795	892	795	832	6175	8175		
	3 x MET83MB	2	Without	795	892	795	832	6175	8175		
	3 x MET71MB	2	Without	795	892	795	832	6175	8175		
11	3 x MET71MB	2	Without	795	892	795	832	6175	8175		
12	3 x MET71MB	2	Without	795	892	795	832	6175	8175		
	3 x MET83MB	2	Without	795	892	795	832	6175	8175		
	3 x A275	2	Without	795	892	795	832	6175	8175		

Layout of stays attachment points on platform exhaust side according to WinGD standard design



Max. permissible force in lateral direction	F_h	(kN)	± 200
Stiffness	k	(N/m)	0.6×10^9
Permissible vertical stays displacement	Def_v	(mm)	± 50
Permissible horizontal stays displacement	Def_h	(mm)	± 50
Permissible angular stays displacement	Def_a	(°)	2

Layout of stays attachment points on platform fuel side according to WinGD standard design



Max. permissible force in lateral direction	F_h	(kN)	± 200
Stiffness	k	(N/m)	0.6×10^9
Permissible vertical stays displacement	Def_v	(mm)	± 50
Permissible horizontal stays displacement	Def_h	(mm)	± 50
Permissible angular stays displacement	Def_a	(°)	2

Requirements for application of hydraulic stays on fuel side AND exhaust side

- The selected stays must have maker's acceptance for both side engine installation. WinGD approved supplier : Green & Clean Technology Co., Ltd (Korea)
Hanmi Hydraulic Machinery Co., Ltd (Korea)
Nantong Navigation Machinery Group Co., Ltd (China)
- Installed on fuel side (FS) AND exhaust side (ES).
- The amount of stays must be determined based on the requirement and stays suppliers specification. The transferred forces must be taken into consideration. The engine forces and moments are defined in the relevant engine dynamic data sheet "Forces and Moments" which is linked in the Marine Installation Manual (MIM). Stay pre-tensioning forces (max. piston hydraulic force) must also be considered and are provided by the stays supplier.
- The stay attachment point requirements must be crosschecked with the specification. The maximum forces transferred by the selected stays type must be within the range as defined on this drawing for standard engine execution. If the total force per stay exceeds the permissible range, reinforcement of the platform attachment points can be requested from the engine builder.
- The stays must adapt to the ship hull deformation and reduce the static reaction force acting on the engine and ship hull attachment points.
- The stays must increase the total stiffness of the system to avoid harmful resonance conditions. The dynamic stiffness of the stays (dynamic spring rate) is provided by the stays supplier.
- The stays must dampen accordingly to ensure that the acceptable vibrations (RMS limits) for the WinGD 2-stroke engine are met.
- The performance of the stays must be checked during sea trial by vibration measurements.
- The installation and commissioning of the stays must be in accordance with the supplier's instructions.

Requirements on stays attachment points at ship hull side (per engine stay)

Max. force acting on ship's hull	F_{hmax}	(kN)	*1)
Minimum stiffness	k_{min}	(N/m)	0.5×10^9
Permissible deflection per 100 kN	Def_{max}	(mm)	0.2

*1) Maximum engine force resulting from lateral moments of X/H type at the project specific rating plus stays pre-tensioning force according to stays supplier's specification

WinGD				ENGINE STAYS			
Stays location: BOTH SIDES				Stays location: BOTH SIDES			
Scale: 1:60	ISO 15724	ISO 15724	ISO 15724	Scale: 1:60	ISO 15724	ISO 15724	ISO 15724
Material: 16Mn	16Mn	16Mn	16Mn	Material: 16Mn	16Mn	16Mn	16Mn
Design: 9715	9715	9715	9715	Design: 9715	9715	9715	9715
Drawn: AD	AD	AD	AD	Drawn: AD	AD	AD	AD
Checked: PAAD301887	PAAD301887	PAAD301887	PAAD301887	Checked: PAAD301887	PAAD301887	PAAD301887	PAAD301887
Weight: 0.000	0.000	0.000	0.000	Weight: 0.000	0.000	0.000	0.000

WinGD X92-B – Engine Stays (DG9715)

TRACK CHANGES

DATE	SUBJECT	DESCRIPTION
2019-03-22	DRAWING SET	First web upload
2019-08-16	DAAD103836 DAAD103839 DAAD103842	Arrangement drgs. – new revisions
2020-02-24	DAAD103844 DAAD103839 DAAD103842	Main and system drgs. – new revision
2020-08-26	DAAD103836	System drg – new revision
2020-10-05	DAAD103839 DAAD103842	System drgs – new revision
2021-03-18	DAAD103836 DAAD103839 DAAD103842	System drgs – new revision
2021-04-19	DAAD103836 DAAD103839 DAAD103842	System drgs – new revision
2022-01-20	PAAD301865 PAAD301882 PAAD301887	System drgs – new revision

DISCLAIMER

© Copyright by Winterthur Gas & Diesel Ltd.

All rights reserved. No part of this document may be reproduced or copied in any form or by any means (electronic, mechanical, graphic, photocopying, recording, taping or other information retrieval systems) without the prior written permission of the copyright owner.

THIS PUBLICATION IS DESIGNED TO PROVIDE AN ACCURATE AND AUTHORITATIVE INFORMATION WITH REGARD TO THE SUBJECT-MATTER COVERED AS WAS AVAILABLE AT THE TIME OF PRINTING. HOWEVER, THE PUBLICATION DEALS WITH COMPLICATED TECHNICAL MATTERS SUITED ONLY FOR SPECIALISTS IN THE AREA, AND THE DESIGN OF THE SUBJECT-PRODUCTS IS SUBJECT TO REGULAR IMPROVEMENTS, MODIFICATIONS AND CHANGES. CONSEQUENTLY, THE PUBLISHER AND COPYRIGHT OWNER OF THIS PUBLICATION CAN NOT ACCEPT ANY RESPONSIBILITY OR LIABILITY FOR ANY EVENTUAL ERRORS OR OMISSIONS IN THIS BOOKLET OR FOR DISCREPANCIES ARISING FROM THE FEATURES OF ANY ACTUAL ITEM IN THE RESPECTIVE PRODUCT BEING DIFFERENT FROM THOSE SHOWN IN THIS PUBLICATION. THE PUBLISHER AND COPYRIGHT OWNER SHALL UNDER NO CIRCUMSTANCES BE HELD LIABLE FOR ANY FINANCIAL CONSEQUENTIAL DAMAGES OR OTHER LOSS, OR ANY OTHER DAMAGE OR INJURY, SUFFERED BY ANY PARTY MAKING USE OF THIS PUBLICATION OR THE INFORMATION CONTAINED HEREIN.