APPENDIX 1

Window Air Conditioner

LW2513ER

TECHNOLOGY THAT'LL BLOW YOU AWAY

Looking for some real cooling power?

How about 24,500 BTUs with a 9.4 Energy Efficiency Ratio? This is our most powerful window unit yet, and can take on up to 1,560 square feet with three cooling and fan speeds.

Plus, with Auto Restart, if the power goes out, your unit automatically turns on after it is restored. Easy breezy.

PERFORMANCE

- 24,000/24,500 BTU
- Cooling EER (BTU/Watts) 9.4/9.4
- Dehumidification (Pts/Hr) 6.8
- Est. Cooling Area 1,560 sq. ft.

PERFORMANCE

BTU Performance	24,00/24,500
EER	9.4/9.4
Energy Star	•
Dehumid. (Pts/Hr)	6.8
Dry Air Flow (CFM) 590/530/484 (High, Mid, Low Speed)	
dBA Level (Indoor/Outdoor) 65/67, 60/64, 57/62 (High, Mid, Low Speed)	
Est. Cooling Area (SQ. FT.)	1,560

FEATURES

Thermostat Control	Thermistor
Air Direction	4-Way
Remote Controller	•
Energy Saver Function	•
Timer 24 Hr,	On/Off
Fan Speed Cooling	3
Fan Only Speed	3
Compressor	Rotary
In Door Fan Type	Turbo
Type Air Discharge Top Discharge Outdoor Vent/Exhaust	•
Chassis Type	Slide In-Out1

3MATERIALS/FINISHES

Available Colors	White

ELECTRICAL RATINGS

Voltage/60Hz	208/230
Watts	2,550/2,600
Rated Amps	12.7/11.7

DIMENSIONS

Product (WxHxD)	26" x 17 11/16" x 28"
Shipping (WxHxD)	29 1/8" x 22 7/16" x 30 7/16"
Net Weight	129 lbs.
Shipping Weight	147 lbs.
Stuffing Quantity	(20ft/40ft) 84/192

LIMITED WARRANTY

1 Year Parts and Labor

UPC CODES

LW2513ER 048231 368605

Life's Good

Window Air Conditioner

LW1813HR

CELEBRATE BEING INDECISIVE

Temperatures don't always match up with their corresponding season. Which is why we've created an energy efficient, single unit air conditioner and heater. It provides seasonal heating and cooling so you can feel comfortable all year round, no matter the season. And with 18,000 BTUs, it can heat up to 550 square feet, or cool up to 1,000square feet.

PERFORMANCE

- 17,500/18,000 BTU Cooling
  9,800/12,000 BTU Heating
- Cooling EER (BTU/Watts) 9.7/9.7
- Dehumidification (Pts/Hr) 5.5
- Est. Cooling Area 1000 sq. ft.

FEATURES

- Seasonal Heating & Cooling
- Multiple Cooling/Heating Speeds
- 4-Way Air Direction
- Remote Control
- Timer 24 Hr. On/Off

PERFORMANCE

BTU Performance (Cooling)	17,500/18,000
BTU Performance (Heating)	9,800/12,000
EER	9.7/9.7
Dehumid. (Pts/Hr)	5.5
Dry Air Flow (CFM)	430
dBA Level (Indoor/Outdoor)	55/63
Est. Cooling Area (SQ. FT.)	1,000

FEATURES

Thermostat Control	Thermistor
Air Direction	4-Way
Remote Controller	•
Auto Swing	•
Energy Saver Function	•
Timer On/Off	24 Hr,
Fan Speed Cooling/Heating	2/2
Fan Only Speed	2
Compressor Rotary	
In Door Fan Type Blower	
Type Air Discharge Side	Side by
Outdoor Vent/Exhaust	•
Chassis Type OutLW1813HR	Slide In-

MATERIALS/FINISHES

Available Colors	White

ELECTRICAL RATINGS

Voltage/60Hz	208/230
Watts 1,800/1,850	(Cooling)
Watts (Heating)	3,100/3,670
Rated Amps (Cooling)	9.0/8.3
Rated Amps (Heating)	15.0/16.0

DIMENSIONS

Product (WxHxD) 5/16"	26" x 16 27/32" x 30
Shipping (WxHxD) 33"	29 3/8" x 21 3/16" x
Net Weight	136 lbs.
Shipping Weight	150 lbs.
Stuffing Quantity 84/176	(20ft/40ft)

LIMITED WARRANTY

1 Year Parts and Labor

UPC CODES

LW1813HR 048231 368636

Window Air Conditioner

LW1213HR

SOME LIKE IT HOT.
SOME LIKE IT COLD.

If you're cold, you're cold — even if it's May. That's why we've created seasonal heating and cooling. You're getting all of the things you love about an air conditioner with 12,000 BTUs, a stylish remote and multiple speeds. Only now, you can heat rooms up to 450 square feet, as well as cool rooms up to 550 square feet.

PERFORMANCE

- 11,500/12,000 BTU Cooling
  9,200/11,200 BTU Heating
- Cooling EER (BTU/Watts) 9.8/9.8
- Dehumidification (Pts/Hr) 3.3
- Est. Cooling Area 550 sq. ft.

FEATURES

- Seasonal Heating & Cooling
- Multiple Cooling/Heating Speeds
- 4-Way Air Direction
- Remote Control
- Timer 24 Hr. On/Off

PERFORMANCE

BTU Performance (Cooling)	11,500/12,000
BTU Performance (Heating)	9,200/11,200
EER	9.8/9.8
Dehumid. (Pts/Hr)	3.3
Dry Air Flow (CFM)	265
dBA Level (Indoor/Outdoor)	51/57
Est. Cooling Area (SQ. FT.)	550

FEATURES

Thermostat Control	Thermistor
Air Direction	4-Way
Remote Controller	•
Energy Saver Function	•
Timer	24 Hr, On/Off
Fan Speed Cooling/Heating	2/2
Fan Only Speed	2
Compressor	Rotary
In Door Fan Type	Blower
Type Air Discharge Side	Side by
Outdoor Vent/Exhaust	•
Chassis Type Out	Slide In-

MATERIALS/FINISHES

Available Colors	White

ELECTRICAL RATINGS

Voltage/60Hz	208/230
Watts 1,170/1,220	(Cooling)
Watts 2,900/3,500	(Heating)
Rated Amps (Cooling)	5.8/5.5
Rated Amps (Heating)	14.0/15.3

DIMENSIONS

Product (WxHxD)	23 5/8" x 14 31/32" x 22 1/16"
Shipping (WxHxD)	27 1/16" x 18 1/8" x 23 5/8"
Net Weight	87 lbs.
Shipping Weight	93 lbs.
Stuffing Quantity	(20ft/40ft) 135/297

LIMITED WARRANTY

1 Year Parts and Labor

UPC CODES

LW1213HR 048231 368629

SAMSUNG

SUBMITTAL EH070CAV / UH070CAV

Slim Duct, single zone split system

www.Quietside.com

Job Name	Location
Purchaser	Engineer
Submitted to	Reference ☐ Approval ☐ Construction ☐
Unit Designation	Schedule #

Specifications

Performance	Nominal Capacity	Cooling/Heating (Btu/h)	24,000 / 27,000
	Capacity Range	Cooling (Btu/h)	6,500 - 27,000
		Heating (Btu/h)	7,000 - 37,000
	SEER / EER		15.1 / 10.2
	HSPF		8.5
	Condensate (pints/hour)		5.6
Power	Voltage (ø/V/Hz)		1 / 208-230 / 60
	Rated Current (Low/Std./Max.)	Cooling (A)	3.0 / 10.5 / 12.0
		Heating (A)	3.0 / 10.5 / 18.0
	Max. Breaker		35 A
	Min. Circuit Ampacity		23 A
Dimensions	W X H X D (inches)	Indoor Unit	43 3/8 X 7 13/16 X 23 5/8
		Outdoor Unit	34 5/8 X 31 3/8 X 12 1/4
	Weight (lbs.)	Indoor Unit	68
		Outdoor Unit	125
	Supply duct connection (inches)		6 X 41 3/4
	Return duct connection (inside, inches)		6 5/8 X 38 1/4
	Condensate Connection		OD 1 1/4", ID 1"
Heat Exchanger	Indoor & Outdoor Unit	Type	Aluminum Fin - Copper Tube
		FPI	18
		Pipe Diameter	1/4 inch
Sound Pressure Level (dB)	Indoor Unit (high)		36
	Outdoor Unit (high)		52
Operating Temperatures	Cooling	°F	14 ≤ T ≤ 115
	Heating	°F	–4 ≤ T ≤ 75
Pipe Connections	Indoor & Outdoor	High side (flare)	1/4"
		Low side (flare)	5/8"
	Maximum Line Set Length		98 ft.
	Maximum Vertical Separation		49 ft.
	Oil Trap		Every 26' of vertical separation
Refrigerant	Type		R410A
	Control Method		Electronic Expansion Valve
	Factory Charge (oz)		67.0
	Charged for		25 ft.
	Additional Refrigerant		0.1 oz/ft over 25'
Compressor	Manufacturer		Samsung
	Type		DC, Inverter Driven, Twin Rotary
	RLA (A)		17.0
Evaporator Fan	Type		Sirocco (3)
	Air Volume (CFM)	Cooling (high)	590
		Heating (high)	688
	External Static Pressure	Standard/max. ("WC)	0.08 / 0.125
Condenser Fan	Motor		BLDC With Axial Type Fan (2)
	Output	W	140
	FLA	Amps	0.65
Accessories	Samsung condensate pump		MDP-E075SEE
	Wireless Remote Control	Wireless remote	MR-AH01U
		Wire from receiver to unit	MRW-10AU
		Wireless signal receiver	MRK-A00U
	Line sets - insulated and flared, interconnect cables included		25' - ILS2509
			50' - ILS5009
Safety Certifications			ETL & ETLc
Warranty	5 Years compressor, 3 Year Parts, 120 Day limited labor		

EH070CAV

UH070CAV

• Low ambient control built in

• Outdoor unit shall provide 208/230V power to indoor unit via 14AWG X 3 interconnect power cable

• Wired controller ships as standard

Construction
Indoor unit chassis shall be constructed from galvanized steel

The outdoor unit shall be galvanized steel with a baked on powder coated finish for durability

Heat Exchanger
The heat exchanger shall be mechanically bonded fin to copper tube

Refrigerant System
The compressor shall be hermetically sealed, inverter controlled, Twin BLDC Rotary

Refrigerant flow shall be controlled by EEV (electronic expansion valve) at outdoor unit

Indoor Fan
Indoor fans are twin backward curved centrifugal Sirocco type with a single BLDC motor

Three fan speed settings and auto setting

Controls
Control signal shall be DDC type signal

Interconnect control wiring shall be 16AWG X 2 shielded wire between outdoor and indoor units

Unit shall be operated via wired or wireless controller

Nominal cooling capacities are based on: Indoor temperature: 80°F DB, 67°F WB. Outdoor temperature: 95°F DB, 75°F WB.
Nominal heating capacities are based on: Indoor temperature: 70°F DB, 60°F WB. Outdoor temperature: 47°F DB, 43°F WB.
Quietside maintains a policy of ongoing development, specifications are subject to change without notice. Refer to www.AHRIdirectory.org for current reference numbers.

Product Specifications

General Data	
Type	Wall Mounted System
Operating Mode	Heat Pump
Number of Zones	1
Multi-Zone Compatible	Yes
System Code	12000000
Performance Data	
Nominal Capacity (BTU)	12,000
Cooling Capacity (BTU)	12,000
Heating Capacity (BTU)	17,500
SEER (Seasonal Energy Efficiency Rating)	18
HSPF	8.5
Phase	1
Frequency (Hertz)	60
Recommended Breaker Size (A)	15
Dimensions	
Maximum Line Length (Feet)	50
Liquid Connection Size (Inches)	1/4
Suction Connection Size (Inches)	3/8
Product Height (Inches)	21 1/2
Product Width (Inches)	31 1/8
Product Length (Inches)	11 1/4
Product Weight (Pounds)	69
Warranty	
Parts Warranty (Years)	3
Heat Exchanger Warranty (Years)	5

Samsung Specifications AQV12NSDX

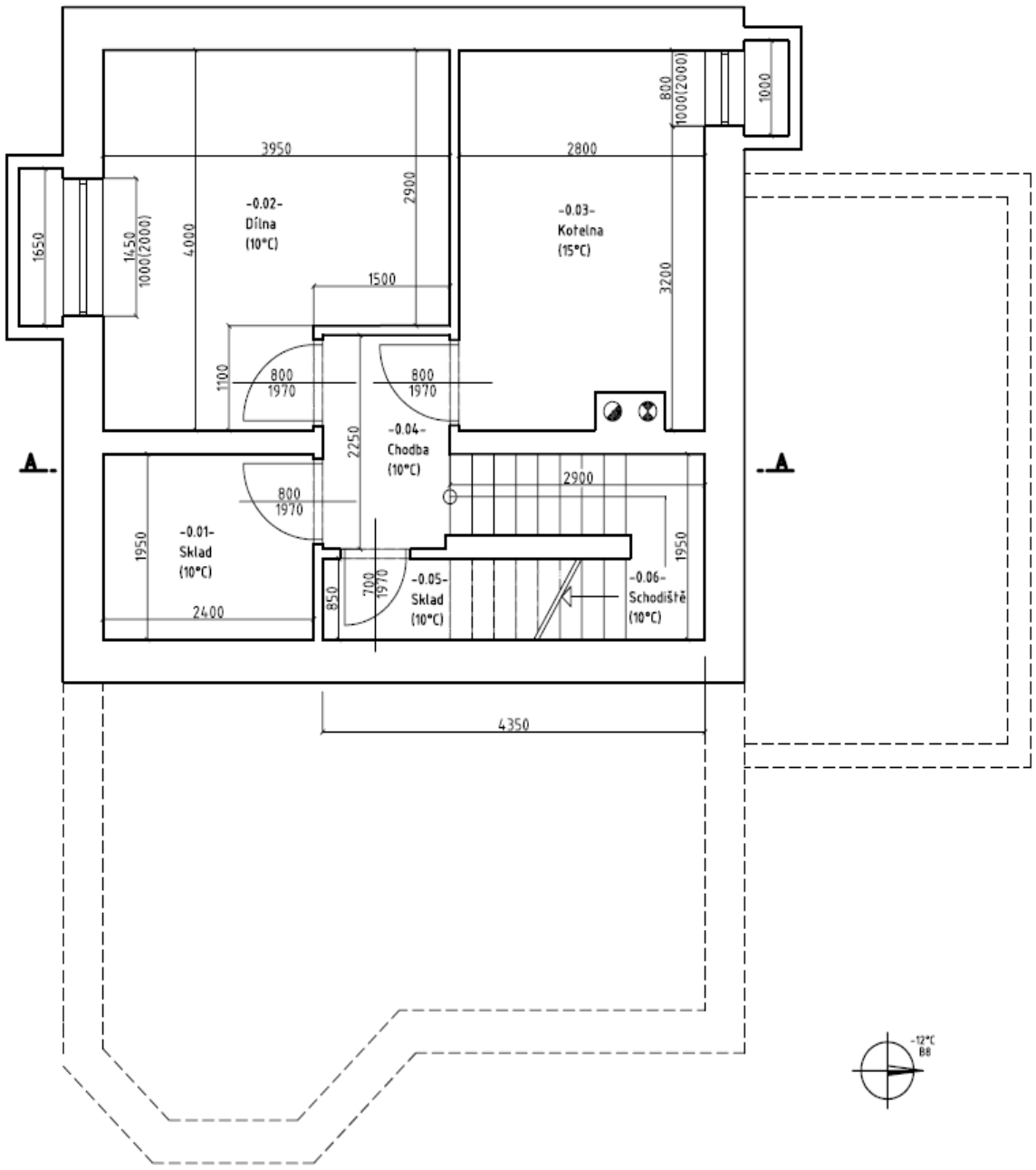
General Data	
Type	Outdoor Condenser
Operating Mode	Heat Pump
Number of Zones	1
Multi-Zone Compatible	Yes
Installation Location	Outdoor
Performance Data	
Nominal Capacity (BTU)	12,000
Cooling Capacity (BTU)	12,000
Heating Capacity (BTU)	13,600
Moisture Removal (Pints/Hour)	5.3
SEER (Seasonal Energy Efficiency Rating)	18
HSPF	8.5
Cooling Power Consumption (Watts)	1090
Heating Power Consumption (Watts)	1170
Maximum Sound Level (dB)	45
Minimum Sound Level (dB)	45
Electrical Data	
Voltage (Volts)	208-230

Samsung Specifications AQV12NSD

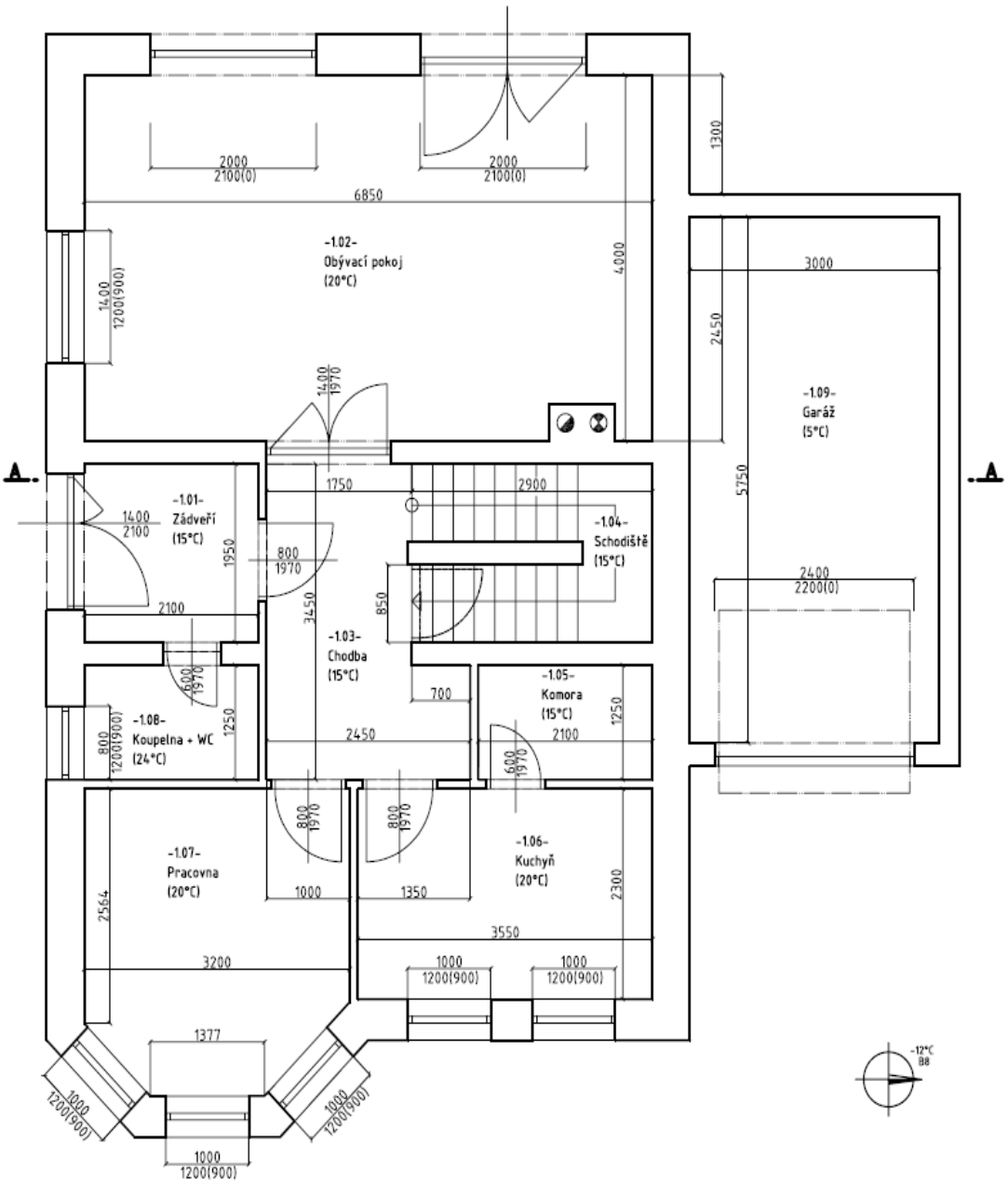
General Data	
Type	Wall Mounted Unit
Operating Mode	Heat Pump
Multi-Zone Compatible	Yes
Remote Control	Wireless
Installation Location	Indoor
Performance Data	
Nominal Capacity (BTU)	12,000
Cooling Capacity (BTU)	12,000
Heating Capacity (BTU)	13,600
Moisture Removal (Pints/Hour)	5.3
Cooling Power Consumption (Watts)	1090
Heating Power Consumption (Watts)	1170
Maximum Air Flow (CFM)	285
Maximum Sound Level (dB)	36
Minimum Sound Level (dB)	22
Electrical Data	
Voltage (Volts)	208-230
Phase	1

Frequency (Hertz)	60
Dimensions	
Liquid Connection Size (Inches)	1/4
Suction Connection Size (Inches)	3/8
Product Height (Inches)	11 1/4
Product Width (Inches)	32 1/2
Product Length (Inches)	7 1/2
Product Weight (Pounds)	18
Warranty	
Parts Warranty (Years)	3
Heat Exchanger Warranty (Years)	5

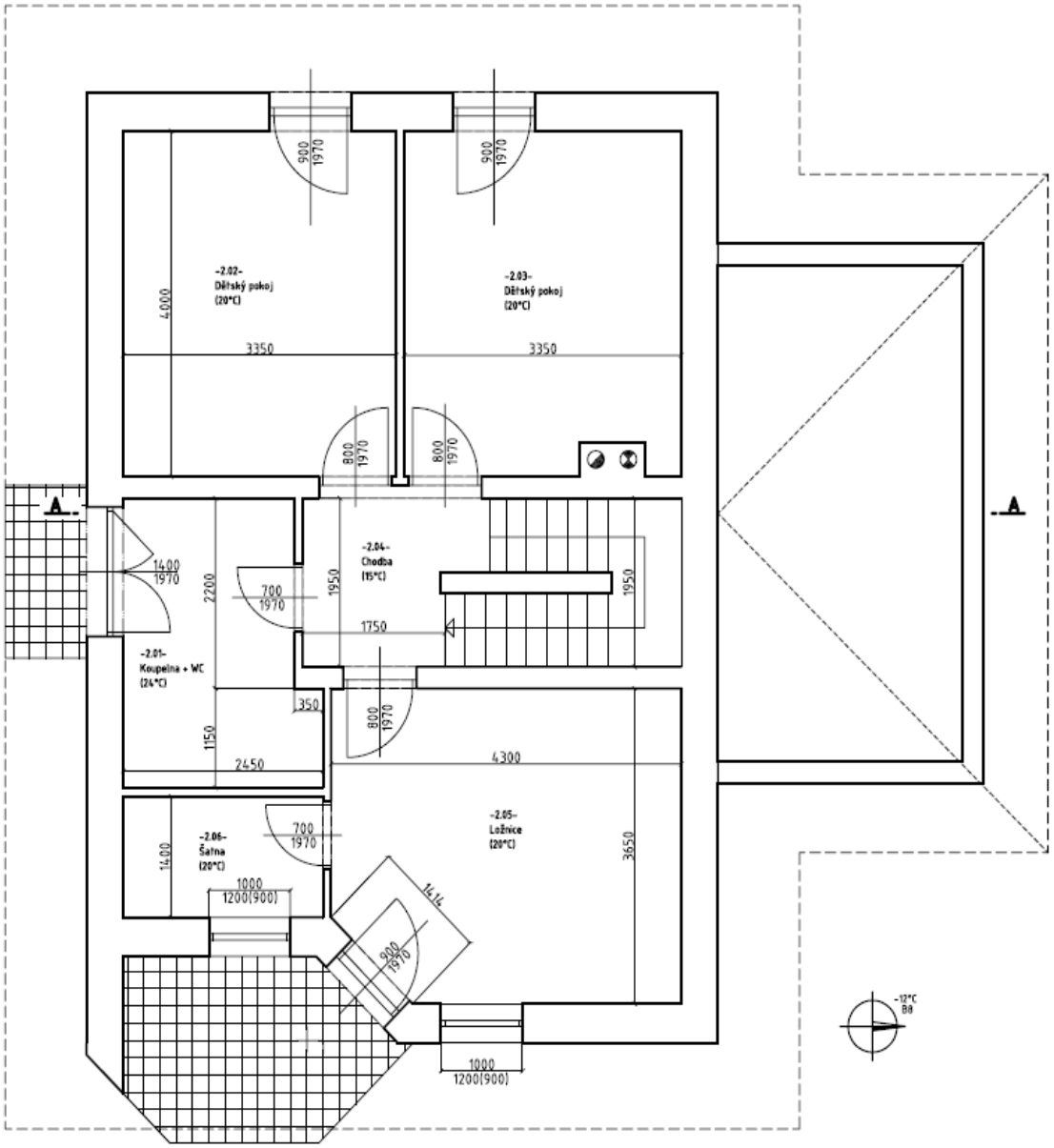
APPENDIX 2A: HORIZONTAL VIEW OF GROUND FLOOR [46]



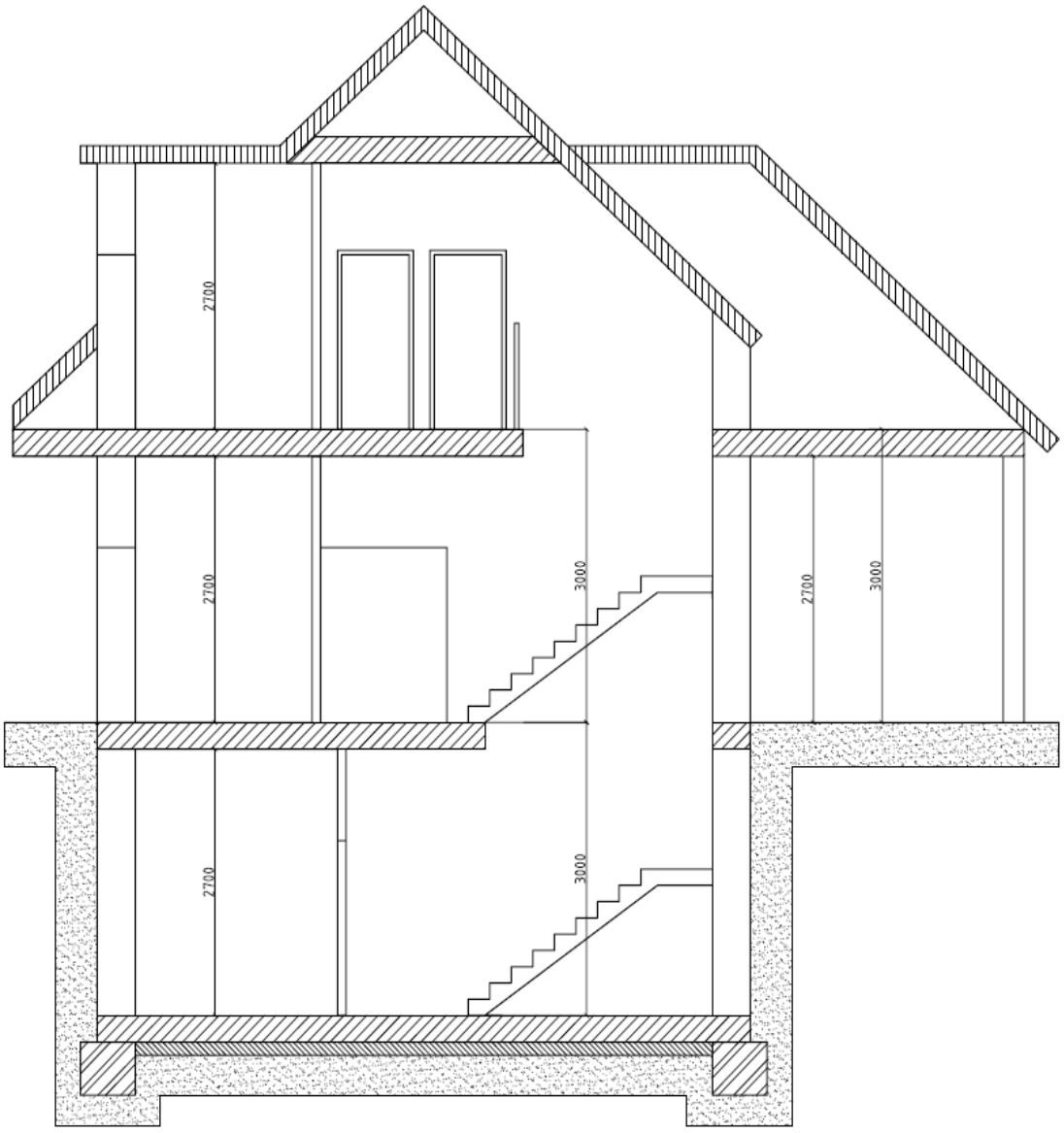
APPENDIX 2B: HORIZONTAL VIEW OF FIRST FLOOR [46]

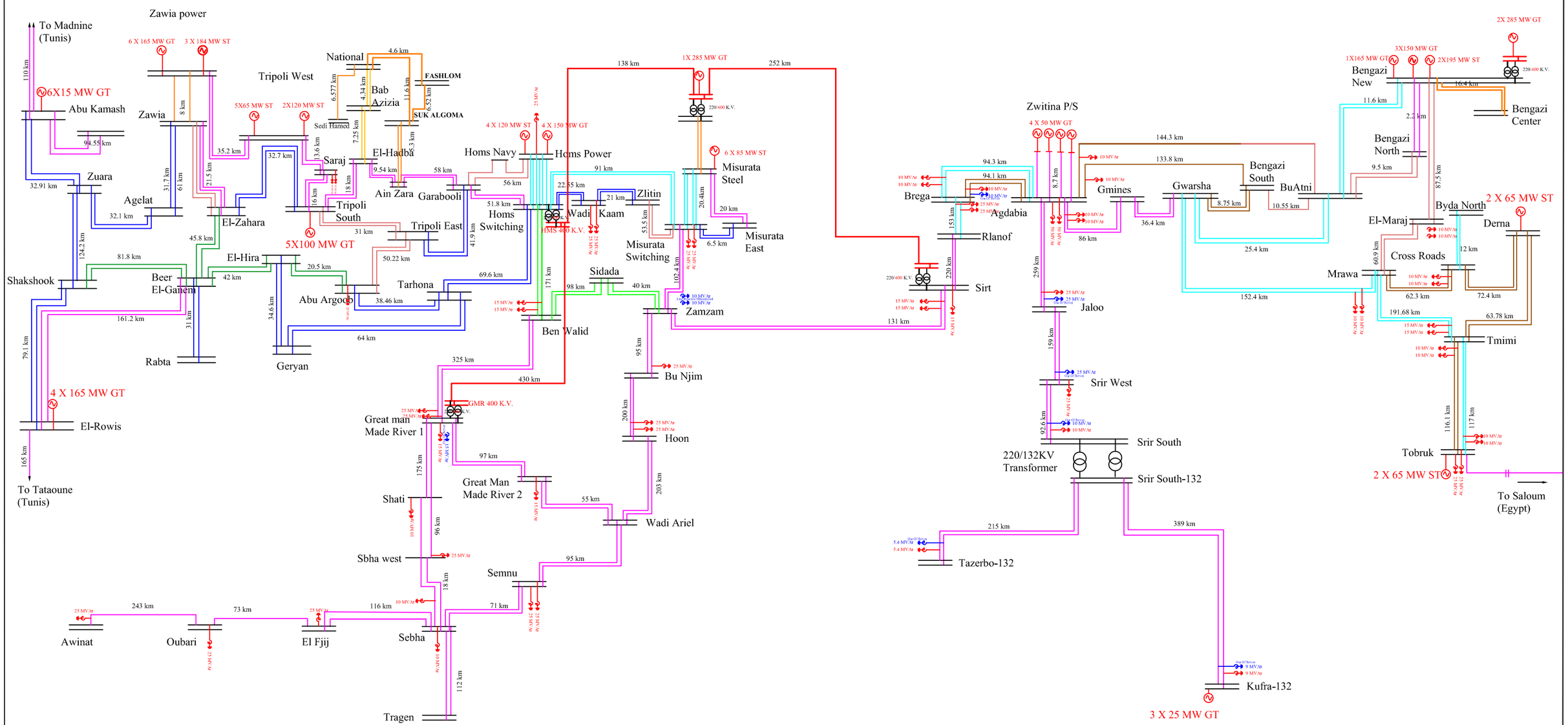


APPENDIX 2C: HORIZONTAL VIEW OF SECOND FLOOR [46]



APPENDIX 2D: CROSS SECTION OF HOUSE A-A [46]





LEGEND

- REDWING SINGLE /ACSR
- REDWING BUNDLE /ACSR
- GOOSE /ACSR SINGLE
- AL. ALLOY BUNDLE
- ACKC SINGLE /USSR
- ACKC BUNDLE /USSR
- XLPE CABLE 630
- XLPE CABLE 1000
- SUPER CONDUCTOR
- Power Station (Generation)
- Reactor

TECHNICAL CHARACTERISTICS OF LINES GIVEN PER CIRCUIT

CODE	TYPE OF CONDUCTOR	CROSS-SECTION mm2 ALUMINIUM	CROSS-SECTION mm2 STEEL	R ohm/km AT AMB.TEMPER 25°C	R ohm/km AT AMB.TEMPER 50°C	X Ohm/Km	B sim/Km	C nF	Q MVAr/100Km	R• Ohm/Km	X• Ohm/Km	B• sim/Km	C• nF	Capacity (MVA) 25°C	Capacity (MVA) 50°C	Capacity (Amp) 25°C	Capacity (Amp) 50°C
A	REDWING S /ACSR / SINGLE COND PER PHASE	361.87	82.34	0.0814	0.0896	0.4168	2.7309	8.69	13.22	0.456	1.68	1.464	4.66	315	240	830	630
B	REDWING B /ACSR / BUNDLE COND PER PHASE	723.74	164.68	0.0407	0.0448	0.3031	3.7095	11.8	17.95	0.4179	1.57	1.465	4.66	630	475	1660	1250
C	GOOSE /ACSR / SINGLE COND PER PHASE	322.91	41.86	0.0920	0.1043	0.4231	2.6884	8.5	13.01	0.2794	1.1911	1.78	5.66	290	220	770	580
D	AL. ALLOY B / BUNDLE COND PER PHASE	827	------	0.0397	0.0430	0.3108	3.6612	11.65	17.73	0.4083	1.601	1.525	4.85	630	475	1660	1250
E	ACKC S /USSR / SINGLE COND PER PHASE	400	93	0.0800	0.09010	0.4140	2.7300	8.68	13.2	0.441	1.673	1.395	4.44	320	240	835	625
F	ACKC B /USSR / BUNDLE COND PER PHASE	800	186	0.040	0.045	0.3011	3.7083	4.8	17.95	0.2002	0.75	0.983	3.13	640	480	1670	1250
G	XLPE CABLE CROSS LINKED POLYTHENE	630 COPER		dc at 20C 0283		0.147	47.12	150	228	0.32	0.221	34.8	110	240	230	630	620
H	G(Z)TACSR 370mm2				0.0898	0.42757	2.723	8.67		0.309	1.187	1.66	5.0				
k	XLPE CABLE	1000 COPER			0.023	0.175	65.973	210		0.057	0.079						985

General Electricity Company Of Libya

Title	220 Kv Network Of Libya
Scale	no scale
File name	SLD-220LIB_2009
Date	1 .Nov. 2009

CURRICULUM VITAE

Name: Ing. ALMABROK ABDOALHADE ALMABROK

Born: 01 November 1965 in BANIWALID

Education:

1985 - 1989 Higher Institute of Industrial Technology. Tripoli.

2001 - 2002 English course. Masaryk University. Brno.

2002 - 2004 Master's degree. MSc. Faculty of Electrical Power Engineering and Communication. Brno University of Technology

2008 - Doctoral Study. Faculty of Electrical Power Engineering and Communication. Brno University of Technology

Professional experience:

1989 - 2001 Wool Textile Company, BANIWALID.

2007 - 2008 Higher Institute of Technology. BANIWALID.

Teaching experience:

2007 - 2008 Higher Institute of Technology. BANIWALID.

Membership in organizations:

Libyan General Union for Engineers

IEEE, Power Engineering Society

List of Publication:

[1] A, ALMABROK. *Load Flow Solution*. Poznan: INSTITUTE OF ELECTRICAL ENGINEERING AND ELECTRONICS POZNAN UNIVERSITY OF TECHNOLOGY, 2009. ISBN 978-83-89333-24-7.

[2] A, ALMABROK. *Load Flow Solution With Estimation 1% and 3% Yearly Load Growth For The Period Of Ten Years*. Poznan: INSTITUTE OF ELECTRICAL ENGINEERING AND ELECTRONICS POZNAN UNIVERSITY OF TECHNOLOGY, 2010. ISBN 978-83-89333-34-6.

[3] A, ALMABROK. *Cogeneration and Tri-generation*. Poznan University of Technology, April 11-13, 2011. p 79-80. ISBN 978-83-89333-39- 1.

[4] A, ALMABROK. *Utilization Of Solar Energy In Libya*. Poznan University of Technology, April 11-13, 2011. p 105-106. ISBN 978-83-89333-39-1.

[5] A, ALMABROK. Poznan University of Technology academic journals. Electrical engineering*: Comparison between cogeneration and separate production of heat and electricity*. Poznan University of Technology, 2012, Issue 70. p167-172. ISSN 1897- 0737.

[6] A, ALMABROK, BARTOŠÍK T, VÁVRA J and TOMAN P. *Possibilities of Installing Photovoltaic Power Plant in Southern Region in Libya*. Brno University of Technology, 2012. p 543-547. ISBN 978-80-214-4514- 7.

[7] A, ALMABROK, P TOMAN. *Evaluation of Power Grid Development Using Newton-Rapshon Method*. Brno: Brno University of Technology, 2010. ISBN 978-80-214-4094-4.